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FOURTH SESSION, FOURTEENTH PARLIAMENT

OF THE

PROVINCE OF BRITISH COLUMBIA

SESSION 1920

VOLUME TWO

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PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF LANDS

Hon. T. D. PATTULLO
Minister of Lands

REPORT OF OIL SURVEY

IN THE

PEACE RIVER DISTRICT

1919

By J. C. GWILLIM

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VICTORIA, B.C., February 27th, 1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,
A Member of the King's Privy Council for Canada,
Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

Herewith I beg respectfully to submit the Report of an Oil Survey in the Peace River District of British Columbia in 1919 by J. C. Gwillim.

T. D. PATTULLO,
Minister of Lands.

OIL SURVEY
IN THE PEACE RIVER DISTRICT.

In that portion of British Columbia which lies east of the Rocky Mountains, known as the Peace River District, there is a great area of country similar in geology and topography to the foot-hill country of Alberta. The Alberta foot-hills have in them coal of good quality and large extent, also a few oil-wells, numerous gas-seepages, and some oil-seepages and residues.

It seems not unlikely that these conditions of coal and oil occurrence may be found in the British Columbia portion of the Peace River District, where the Lower Cretaceous strata, which bear these minerals in Southern Alberta, occur under the same conditions. Hence it was considered advisable to place a reservation on these minerals for such a time as may be needed to make some examination of these lands.

For many years there has been an expectation that commercial bodies of oil will be found at some places along the belt of foot-hills which stretches from the boundary of Southern Alberta north-north-westward to and beyond Peace River, or in the plains which lie some distance to the east of the foot-hills.

The occurrence of oil-seepages in Southern Alberta and at places along the basin of Mackenzie River, besides the great outcropping of tar-sands on Athabaska River and tar-springs on Lower Peace River, gave evidence that this great stretch of country was, at least potentially, oil-bearing if suitable structure of the rocks would permit it to accumulate in commercial quantities; such conditions induced the Imperial Oil Company to employ twenty geologists during the season of 1919 and spend half a million dollars on it.

The recent activity in 1913-14 in oil lands in Southern Alberta was caused by finding a light oil, almost a gasolene, in the Dingman well near Black Diamond, thirty miles south of Calgary, in 1913. This Black Diamond field has five wells producing in all fifty barrels a day during the year 1918. A great extent of country was then more or less examined, and holes were put down to depths of 1,000 to 4,000 feet.

The lack of good results is due chiefly to misplaced drilling, often in broken ground, often on wrong structure of the strata, and at places where the oil-bearing strata were beyond the reach of a drill.

Later some activity was shown in the districts east and north of Edmonton, where the assumed oil-bearing strata are within drilling distance, as on Lower Athabaska and Lower Peace River. The results at these places are small amounts of a thick viscous oil from Lower Cretaceous strata which are almost flat-lying.

Within the past year some great oil corporations have interested themselves in this Western and Northern Alberta field; one of which corporations sought concessions in order to examine and develop; the other carried on an investigation of it at great expense during the past summer, and is now drilling and preparing to drill at places as far apart as Southern Alberta and in the Mackenzie River basin.

Such being the conditions to the south, the east, and the north of the Peace River District in British Columbia, it appeared worth while to at least make a reconnaissance of it, similar to such work as was being done along the same foot-hill belt by the Imperial Oil Company.

Before describing the work done within the British Columbia boundaries, north and south of Upper Peace River, it is necessary to give an outline of the general geology in relation to oil-bearing possibilities, also to understand the conditions which are favourable to the origin and retention of oil.

The geological conditions and structure of Western Alberta and the Peace River District are very similar, all the way from the Montana boundary to the Liard River, a distance of over 800 miles, 400 of which are in British Columbia.

There is the same upthrust and overthrust of the Palæozoic rocks of the Rocky Mountains front ranges, which crumpled up the overlying Cretaceous formations and caused the foot-hills,

a belt of faulted and sharply folded rocks, known as the "Disturbed Belt"; east of this belt the rock folding has been less intense—it dies away in gentler undulations until the strata dip eastwards to form a long parallel syncline or trough, which underlies Calgary, Edmonton, and Dunvegan, on Peace River; still farther east the strata incline upwards toward the great plains and then flatten out.

It is on the two sides of this great syncline or trough that the most likely horizons for oil and gas occur, also the most favourable structure within reach of drilling operations, for the most hopeful Lower Cretaceous strata are too deeply buried beneath the syncline.

Deep boreholes put down along the eastern margin of the great syncline have met *gas* at Bow Island, Medicine Hat, east of Edmonton, on Athabaska River, and other places. Some thick *oil* and *tar* have been found in boreholes east of Edmonton and on Lower Athabaska and Lower Peace Rivers, but neither the quality nor quantity have so far been encouraging.

Passing over to the western margin of the great syncline and between it and the "Disturbed Belt" of the eastern face of the Rocky Mountains, a lighter, more valuable oil has been found at places northwards from the Montana boundary to Bow River. It is in this strip that the Black Diamond field occurs; its total daily output is small, not over 50 to 100 barrels a day.

It is possible that somewhere along this foot-hill zone oil in greater quantities may be met with; it is a high-priced oil and likely to occur in narrow fields which are not to be found without close work and many trials by rather deep holes.

Concerning the formations found in the foot-hill belt, it is believed that these were, when laid down as sediments, not far from the ancient western shore of the Cretaceous Sea; hence they are likely to consist of coarser material, such as sandstones and conglomerates; they are also likely to be thicker than their contemporaneous equivalents deposited as silt or mud farther eastwards on a marine floor. Thus the Bullhead sandstones of Hudson Hope are coarse material laid down in brakish water, while their probable equivalent, the Peace River sandstones and Loon River shales, are of much finer material and less thickness. So that, although the geological horizon is believed to be the same, the constituent material is quite different, and it may be that they differ widely in oil-bearing qualities.

We know very little of the origin of any oil so far found; broadly, it must be derived from the strata in which it occurs or from below them, for where water is present oil is unlikely to sink or descend, for water displaces it or forces it up against an impervious roof. If the origin of this oil is credited to buried organic material, it may have its source in any bed or stratum, such as limestones or shales, containing this material.

The Devonian limestones underlie Lower Peace River and Athabaska, and as they carry oil-seepages themselves may be the source of oil in these districts. In the foot-hills belt the underlying sediments are Jurassic and Triassic.

There is no certitude in the matter of oil origin. We can only look for suitable geology, structure, and depth. Conditions which favour it are a porous stratum, usually sandstones, but sometimes shale or limestone. This porous stratum should be arched up as an anticline or dome and sealed by overlying shales or mud. Sometimes the arch is not necessary, as the oil may be caught against a sealed fault or other capping.

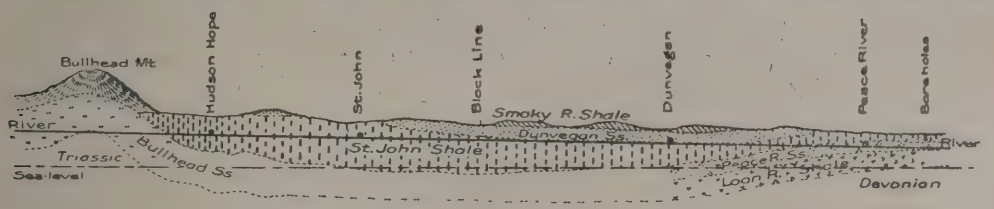
The oil of Black Diamond field in Southern Alberta, the tar-sands of Athabaska, and the heavy oil of Lower Peace River occur in the lowest Cretaceous strata; these have different names in different localities, but are believed to be of much the same geological horizon, and they rest upon the rocks of an earlier period, Jurassic, Triassic, and Devonian, in these different localities.

The Kootenay formation, in which the Black Diamond oilfield probably occurs in Southern Alberta, has its counterpart in Upper Peace River in the Bullhead sandstones; both are coal-bearing in their upper portions, and both are brought up to the surface in violent folds along the line of the "Disturbed Belt," just east of the Limestone or Palæozoic Mountains; they do not show much evidence of oil residues or leakage along this line of outcrop, but this may have no great significance, as such are often absent in known oil-bearing strata.

Above the Kootenay and Bullhead sandstones lie the impervious shales called Benton in Southern Alberta and St. John on Peace River.

The geological sequence on Peace River itself may be tabulated as follows:—

Upper Peace River.	Dunvegan.	Peace River Crossing.
Remnants	Smoky River shales	Absent.
Dunvegan sands	Dunvegan sands	Absent.
St. John shales	Buried in syncline	St. John shales.
Bullhead sands	Buried in syncline	{ Peace River sands. { Loon River shale.
Devonian		Triassic.



Generalized Cross Section

The Peace River sandstones and Loon River shales are considered to be the eastern, seaward, equivalent of the Bullhead western shore deposits; both are Lower Cretaceous, the one lying on Devonian rocks, the other on Triassic sandstones and shales. Between these two is the great syncline or trough which buries them so deeply at Dunvegan that the upper formations alone rise to the river and prairie levels.

Within the area covered by our traverse on Upper Peace River the Upper Cretaceous formations, Smoky River and Dunvegan, occupy the mountain masses and do not offer a good structure for the retention of oil. The main valleys, however, have been cut quite deeply in some places into the underlying St. John shales. These shales in turn overlie the Bullhead sandstones.

Assuming the Bullhead standstones, or the Triassic below it, to be the most likely oil-bearers, our work then was to find suitable structure and reasonable depths to reach desired strata. Hence the chief objects of our survey were to get a general knowledge of the localities where the St. John shales were most deeply eroded or cut into, so that the drilling distance might be shortened; also to find such conditions of folding or arching in them as are usually considered requisite for forming oil-reservoirs beneath an impervious shale such as the St. John formation.

On June 20th I received instructions to proceed to Peace River and conduct such examination as was possible during the summer. Three other men were engaged, all of whom were, or had been, Peace River men and knew the country. L. M. Bower, a returned soldier from Finlay Forks, went with me from Vancouver; H. C. Garbitt, packer, and his outfit, and E. Ouelette, cook, were engaged at Hudson Pope. We arrived at Hudson Pope on June 7th, and left it on the 10th for a trip up the Peace River to 12-Mile Creek and to the South Fork of Halfway River, forty-four miles north of Hudson Hope.

On July 23rd, in company with Dr. J. S. Stewart, of the Dominion Geological Survey, we left for a traverse of the country south and south-west of Peace River Block. We returned to Hudson Hope on September 3rd; then came down the Peace River 240 miles in an open boat to the town of Peace River; thence to Victoria on September 18th.

In such work a geologist does not usually *find* oil; his work is to trace out oil-bearing horizons and favourable structures of the overlying strata, also to examine any seepages, residues, or other evidences. I saw none, and only heard of one occurrence of bitumen or tarry residue which appears to be true.

I do not think that the Imperial Oil geologists doing similar work in adjacent areas, and on some of the same area as myself, found or certified such seepages or residues, excepting in the Dunvegan sandstones on Pouce Coupe River within the Peace River Block.

Hence our work was spent on tracing out formations and structures. Assuming that some portion of the Lower Cretaceous sandstones, or the underlying Triassic shales and sandstones, may be an oil horizon, we tried to locate places where these would be within reach of a drill

and of a structure suitable for retaining oil. The Upper Cretaceous St. John shales and Dunvegan sandstones might also carry oil, but in the area examined they are not structurally hopeful.

We were on the trail fifty-six days; mostly Indian hunting-trails, brushy and often wet. During this time we averaged eleven miles a day pack-train travel and could only examine the country in a reconnaissance way. The trails usually follow valleys which are here deeply cut down into the strata and give good exposures of them. When crossing the mountain masses or uplands between these valleys there was little to see but thick woods, unless it was a general view from some high point, such as Tuskoola Mountain, 5,000 feet, or Salt Hill, 4,000 feet altitude.

In doing this rough or preliminary survey of the geological conditions I was accompanied for most of the season by Dr. Stewart, whose former work in Southern Alberta and experience of the Middle West and Southern United States oilfields made our work much more certain than it would otherwise have been, for no geologists have preceded us in many places. The packer also contributed greatly in knowing the trails and country; we lost no time by mistakes, inefficiency, or casualty.

PHYSIOGRAPHY.

Compared with similar areas of Southern Alberta foot-hills, this Peace River District shows a greater magnitude in several ways. The streams are larger, the mountain masses between them are less cut up or dissected by tributaries, and the geological horizons are not so often repeated by block faulting or folding. The strata, after passing eastwards from the upthrust and crumpling of the Rocky Mountains proper, roll gently or undulate until they flatten out and decline at low angles beneath the great trough or syncline which crosses Peace River near Dunvegan. The general altitude of the deeply cut major valleys is from 1,750 to 2,800 feet, and of the mountain masses between them 3,000 to 5,000 feet above sea-level.

The line of abrupt or disturbed geology adjacent to the Rocky Mountains limited our field-work in that direction; such places are not favourable; they are marked on an accompanying map, so also is the line of gentle dip towards the great syncline. This strip of country between these two lines is the portion worth investigation.

In this strip of country traversed by us from the South Branch of Halfway River, forty-four miles north of Hudson Hope, to Flat Creek, ninety miles south-east of it, these formations are met with in descending order:—

(1.) Smoky River shales as remnants on hill-tops.
(2.) Dunvegan sandstones, 530 feet according to McLearn.
(3.) St. John shale, 2,100 feet according to McLearn.
(4.) Bullhead sandstone, 2,000 feet according to McLearn.
(5.) Triassic shales and sandstones, presumably below.

These thicknesses of strata are as estimated by F. H. McLearn, of the Dominion Geological Survey, during his examination of the Peace River section from the Parle Pas Rapids to Vermilion Chutes in 1917. (Summary Report, 1917, Part C.) These estimates may not apply to the country south of Peace River, but are a guide.

Within the strip under consideration the Smoky River shales occur as remnants high up in the hills, the Dunvegan sandstones form the upper hillsides, and the St. John shale is more or less deeply cut into by the main valleys and depressions.

The Bullhead sandstone is everywhere covered, and only appears along the eastern edge of the more severe folding within the "Disturbed Belt," as at Hudson Hope Canyon, and on the upper branches of the Moberly and Pine Rivers.

These Bullhead sandstones are considered by McLearn to be the shoreward equivalent of the Peace River sandstones and Loon River shales. It is near the base of the latter that oil is found on the Lower Peace River at about 1,100 feet below the river-level. These are the lowest Cretaceous rocks of the western plains; the Kootenay formation of Southern Alberta, also oil-bearing at Black Diamond field, is probably their southern representative; it is also a shoreward coarse sediment, similarly coal-bearing, in its upper portion, as Bullhead is.

In this connection it should be understood that the shore of the Early Cretaceous sea lay more or less where the present upthrust Rocky Mountains now are; the sediments deposited in brackish water along this shore were gravel and sand; farther east and northwards the sediments of the same period were more muddy or fine, and were laid down on a marine or sea

floor: thus, while Bullhead sands were accumulating along the shore-line, Loon River silts and shales, with some thin beds of fine sands, were accumulating on the sea-floor 200 miles eastwards and north-eastwards where Lower Peace River now is.

The chief factors, then, in favour of the Bullhead sandstones as an oil horizon are:—

(1.) Its geological equivalency to the oil- or tar-bearing strata of Lower Peace River, Athabaska River, and of the Black Diamond light oils in Southern Alberta.

(2.) These Bullhead sandstones are structurally favourable; that is, there are rolls, saddles, or anticlines, covered by St. John shale, which seems quite impervious enough to hold down any oil beneath them.

The chief factors against the Bullhead subaerial sandstones as a receptacle of oil are:—

(1.) McLearn thinks them "too massive to serve as a suitable reservoir, and in such strata the presence of oil is improbable."

(2.) We have no proof that oil exists in them or below them, even if they are porous enough to receive it.

However, possibilities are in them sufficient to justify the extensive reconnaissance of the Imperial Oil Company in adjacent areas and of the work done in the British Columbia area last summer. This applies especially to the first down-warp, roll, or sealed fault between the uprising strata of the great syncline trough and the edge of the broken or "Disturbed Belt" farther west. Thus any gas or oil within the syncline might be pushed up westwards by water-pressure to lodge at the first suitable structure approaching the foot-hills. To drill and prove them requires careful choice of location and much time and money, for unless oil is met within the upper portion of Bullhead sandstones, great depths, up to 4,000 feet, may be needed to reach the base.

At several places within the area traversed the upper Bullhead sandstones are within 1,000 feet of the valley's surface. These places are indicated on the maps. Special attention and more detailed work might be given to the following localities:—

(1.) In the vicinity of the trail crossing of the South Branch of Halfway River, forty-four miles north of Hudson Hope, and points north-east and east of it.

(2.) At Hudson Hope itself, and the Gates, a few miles below it, on Peace River. (This is within the Peace River Block.)

(3.) Near the west end of Moberly Lake at greater depth (also within the Peace River Block).

(4.) On Peace River beside the northern base of Table Mountain (Peace River Block).

(5.) On Lone Prairie and East Pine River.

(6.) On East Pine River, five or six miles below Flat River.

(7.) On Flat River, an eastern branch of East Pine, sixty-five miles south of its junction with Pine River proper.

The St. John shales appear to be more or less anticlinal at these places. They are most deeply cut into at (2), (4), and (7), where the depth to Bullhead sandstones is probably less than 1,000 feet.

It must be remembered that all these places are somewhat remote; Hudson Hope is the only place to which drilling-rigs could be brought without first making roads. Also it may be found, after detailed geological work is done on them, that faults or breaks occur along or beside them, which may be unfavourable by reason of allowing the oil or gas to escape.

SUMMARY.

Regarding the area covered by our traverse and shown on the attached map:—

(1.) No oil has yet been found and no residues or gas-leaks of much importance.

(2.) There is a possibility of oil existing below some of the favourable structures which occur.

(3.) The most likely strata are beneath the St. John shales, which are impervious enough to hold oil down.

(4.) The Bullhead sandstones, a shore, brackish water, or subaerial deposit, lie below the St. John shales; these are geologically more or less contemporaneous with or equivalent to the oil-bearing Loon River strata and the Athabaska tar-sands. They also resemble the Kootenay of Southern Alberta of much the same horizon, which is believed to be the oil-carrier at Black Diamond field.

(5.) Assuming the Bullhead sandstones or some underlying formation to produce or carry oil, the necessary work then is to find places where it is structurally favourable and within reach of a drill.

(6.) The thickness or depths to reach any given horizon are very uncertain, but some places offer less vertical depth than others.

(7.) The map shows where these places are and where the structure is most favourable. Such places are in valleys or depressions which have been cut deeply into the St. John shales.

(8.) It is possible, considering the activity of the Imperial Oil Company, that somewhere within the great extent of these Alberta and British Columbia foot-hills an oil discovery of commercial value may be made, and so revive the interest, and perhaps the wild and foolish speculation, of five years ago.

Under these conditions, as above designated, it seems advisable to have at Victoria some more definite knowledge of the geology and structure of the British Columbia area, for up to this time little work has been done on it by the Dominion Geological Survey, excepting on Peace River itself, which portion is mostly within the Federal "Peace River Block" and the Province of Alberta.

Neither is the British Columbia area accurately mapped, because it is outside of the operations of the Dominion Lands Survey.

APPENDICES.

APPENDIX A.

CLIMATE AND AGRICULTURE.

Peace River is generally credited with an early spring, at least as early as the wheat-growing areas of Manitoba and Saskatchewan. The late Dr. G. M. Dawson, at one time Director of the Geological Survey of Canada, gives an average date for the opening and closing of the river by floating ice. These dates are April 21st and November 7th, between the years 1866 and 1875. It is unlikely that these events have undergone much change in the matter of time or that the climate has changed; there are, however, apparently considerable variations in the warmth and rainfall of the summer seasons.

Last year (1919) had a late spring all over Canada. The growth of vegetation at Hudson Hope early in July did not indicate an early spring, and I am inclined to think, from information, that spring, though early, does not bring summer and growth as soon as in the wheat districts of Manitoba and Saskatchewan.

Within the area north and south of Hudson Hope the growth after July 10th was very rapid and reached astonishing developments in the way of weeds, such as wild parsnips 10 feet high, fireweed 7 feet, and peavine as much or more. This was a tribute not only to the weather, showers, and very heavy dews, but to the soil of some of the valleys. The rainfall for July was 3¼ inches; for August, 3⅜ inches; and on September 4th to 5th, 1.42 inches, as recorded at Hudson Hope. It seems to be usual that July and August have much rain, while early summer is dry. The whole country, mostly wooded, bears tribute to a sufficiency of precipitation or such a conservation of it as keeps vegetation abundant.

Concerning summer frosts, these occur at irregular times, but do not appear to affect the crops as much as in the early days of Manitoba. Wheat ripens yearly in the main valley of the Peace. None was seen on the uplands or upper valley-levels, excepting a late-sown patch on Lone Prairie, which is about 1,000 feet higher than Hudson Hope.

The first severe fall frost occurred on the night of August 31st-September 1st. This frost from experience in Manitoba was not, I think, severe enough to injure nearly ripe wheat. The potato-tops at Middle Pine, 1,750 feet altitude, and at Hudson Hope, 1,500 feet, were only partly cut down. Below Hudson Hope, in the Peace Valley, for the 240 miles to Peace River Crossing, there had been no dangerous frost up to September 12th.

Tomato-plants were untouched at Harmer's ranch, Flat River, on August 26th. This place is 2,300 feet above sea-level; nor were tomatoes injured at Cadenhead's ranch at Halfway River, on the Peace River, on September 7th. On the line of the Dunvegan and Peace River Railway there was more evidence of severe frost a little north of Edmonton on September 12th than at any point seen on Upper Peace River up to September 7th.

Concerning agricultural land, there are within the limits of British Columbia, north and south of Hudson Hope, a few partly wooded prairies and some steep, grassy hillsides on the north banks of the rivers. The main country is thickly wooded with small timber, chiefly spruce, jack-pine, and poplar.

The most desirable flats or wintering-places for stock and feed are already partly taken up by squatters, as at Halfway River, Hudson Hope, Moberly Lake, Pine River and its South and East Branches, Lone Prairie between the latter, and Flat Creek, farthest south of all.

These places are all valley lands or deep depressions, mostly less than 2,600 feet above sea-level. Lone Prairie, one of the most elevated (2,400 feet), is a considerable tract of partly wooded flats nearly surrounded by mountains, an area of about thirty square miles, in which are half a dozen settlers. There are also extensive tracts of easily cleared land on the South Branch of Halfway River, forty-four miles north of Hudson Hope, and on the western side of Kiskatinaw or Cutbank River, south-west of Pouce Coupe.

The greater part of this country, if cleared of its forest-growth, which is useless as timber, would afford good grazing land, while the valley-flats would furnish hay and wintering-places, especially those which are visited by Chinook winds.

On Lone Prairie, Mr. Wartenby, one of the settlers, told me he fed his cattle for only ten days during the winter of 1918-19. This place used to be a favourite wintering-place for Indian horses.

The present situation of this area as regards agriculture now is: Some stockmen on Halfway River; settlers who produce little or nothing about Hudson Hope, having little market; and a few trapper settlers, squatters, and absentees on Peace River above Hudson Hope, near Moberly Lake, and at Middle Fork of the Pine, East Fork of the Pine, on Lone Prairie, at Flat Creek, and along the western side of Kiskatinaw River. These people cannot sell produce, nor have they much stock, excepting one case on Halfway River. The country has only Indian trails; hence those who hold the land must risk a living by trapping or other occupations.

The main highway of the country is the Peace River. This avenue of approach from the eastern railway connections and from the west by way of Fort George and the Parsnip River has a considerable traffic of a frontier character, placer-miners, prospectors, trappers, and other adventurers, or exploration parties. Some money should be spent upon the improvement of the one long portage road at Hudson Hope of fourteen miles, and in making a conspicuous landing-place above the canyon at its upper end, for it is a dangerous approach.

APPENDIX B.

ALBERTA OIL PRODUCTION.

The producing wells are, with one exception, all in a small area on the Turner fold or anticline near Black Diamond; here there are five small producers within an area of about two miles by one mile. The exception is the old "Discovery" or Lineham well, which is near Waterton Lakes, in the south-western corner of Alberta. It is within the Palæozoic or Limestone Mountains and has produced a little oil of a heavier quality than the Black Diamond field.

The Black Diamond field produces oils of a paraffin base which vary from 38 to 62 Beaumé, or 0.831 to 0.729 specific gravity, compared with water which is 1.00.

There are here five producers and on semi-official authority their output has been given as follows:—

Year.	Gallons.	Barrels.
1914	7,640	218.3
1915	7,560	216.0
1916	83,680	2,390.3
1917	274,472	7,842.0
1918	592,712	16,934.5
Totals	966,064	27,601.1

A total of 27,601.1 barrels of 35 imperial gallons of a high-priced light oil suitable for gasolene and for motor-driving.

The oil so far found on the eastern side of the great trough or syncline at points east of Edmonton, Lower Athabaska and Lower Peace Rivers is a heavy oil of asphaltum base—15.5 to 25 Beaumé, or 0.96 to 0.903 specific gravity.

The Athabaska tar-sands have been estimated to contain several thousand million barrels of oil, but the problem is to extract it from gummy sands which contain 10 to 15 per cent. bitumen. The oil which seeps into the wells is in small quantity and too viscous to pump readily; such is also the case on Lower Peace River.

Concerning future developments, it is believed that the Imperial Oil Company, after careful investigation of a large portion of the Province, will soon be drilling at points south of Pincher Creek, south of the Black Diamond field, east of Edmonton, near the western end of the Great Slave Lake, and on the Mackenzie River below Fort Norman.

The two former places are within the foot-hill belt of sharper folding and light oils; the well east of Edmonton is in the nearly flat gas-bearing field which lies east of the great trough or syncline; and the two last are in the vicinity of oil-seepages which are presumed to come from a dolomitic portion of the Devonian strata.

Other wells are here and there also being put down in the Southern Alberta foot-hills, in the area east of Edmonton, at High Prairie near Lesser Slave Lake, and on Lower Peace River.

APPENDIX C.

THE MAP.

In order to show the country traversed and give some illustration of the geology it has been necessary to compile a map or tracing from various sources. The nature of the work did not permit much surveying or map-making, but some corrections have been made and some additions.

The Pre-emptors' Map, No. 3E, 1918, of the Peace River Sheet was used as a base for the tracing and some additions made south of its termination on Rocky Mountain Lake.

None of the maps are correct in places, especially of the country between the East Branch of Pine River and the Kiskatinaw River. Also Flat Creek and Moose Lake are placed too far south on current maps.

Using the Pre-emptor's Map No. 3E, after shifting its latitude lines (which were wrong) and expanding it southwards on the same scale of 4 miles to the inch, I have put on it as many details as seem needed at present.

The St. John shales, which seem to be a vital factor in working out the geology, are shown along the lines of traverse and in the deep valleys by a yellow colour, which will show up on blue-prints.

The cross-section illustrates the undulating character of the strata and the way that the deep valleys have been cut through the crust of the Dunvegan sandstones into the underlying St. John shales; these shales probably cover wider areas than marked on the map, but the uncoloured spaces between them are mountain or upland masses of Dunvegan sandstone, with remnants of Smoky River strata here and there.

The Bullhead sandstones do not appear eastwards of the double-dotted line which passes Hudson Hope. They underlie the St. John shales.

Elevations are given from readings of a more than usually reliable aneroid barometer. Moberly Lake is accepted as it is on the maps. Very little precise levelling has been done west of Dunvegan or St. John, and the elevations given on the tracing may be accepted as more exact than any heretofore. Such elevations are valuable in working out a structure where the strata are gently inclined or undulate.

Geological maps can best be made when there is a fairly accurate and detailed topographical survey of the district to put the geology on, and this must be remembered if the tracing is found somewhat sketchy.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

REPORT

Of the Minister of Justice upon the Statutes of the Legislative Assembly of the Province of British Columbia passed during the Session of 1919.

By Command.

J. D. MACLEAN,
Provincial Secretary.

Provincial Secretary's Office,
April 27th, 1920.

P.C. 746.

Certified Copy of a Report of the Committee of the Privy Council, approved by His Excellency the Administrator on the 10th April, 1920.

The Committee of the Privy Council have had under consideration the attached report from the Minister of Justice, dated 31st March, 1920, upon the Statutes of the Legislature of British Columbia, passed in the ninth year of His Majesty's reign, 1919, and received by the Secretary of State for Canada on 12th April, 1919.

The Minister states that he is of the opinion that these Acts may be left to such operation as they may have, subject to the comments expressed in the said report.

The Committee concur in the opinion of the Minister of Justice and advise that a copy hereof and of the accompanying report, if approved, be transmitted to His Honour the Lieutenant-Governor of British Columbia for the information of his Government.

All which is respectfully submitted for approval.

RODOLPHE BOUDREAU,
Clerk of the Privy Council.

His Honour the Lieutenant-Governor of British Columbia.

DEPARTMENT OF JUSTICE, CANADA.

OTTAWA, March 31st, 1920.

To His Excellency the Governor-General in Council:

The undersigned has had under consideration the Statutes of the Legislature of British Columbia, passed in the ninth year of His Majesty's reign, 1919, and received by the Secretary of State for Canada on 12th April last, and he is of the opinion that these Acts may be left to such operation as they may have, subject to the following comments:—

Chapter 22, intituled "An Act to amend the 'Dolly Varden Mines Railway Act.'" This Act, upon the narrative that the Dolly Varden Mines Company was empowered by local Statute, chapter 53 of 8 George V. 1917, to construct, maintain, and operate a railway from the Wolf Group of Mineral Claims to Alice Arm, provided the construction were completed before 31st December, 1918; that the railway had been only partially constructed; that the cost of construction had not been paid, and that it was expedient to provide for the payment and for an extension of time for completion, proceeds to enact that the real and personal property and rights described in the Schedule of the Act, which appears to be intended to comprise all property, real and personal, of the Dolly Varden Mines Company within the Province of British Columbia, shall be charged, in favour of the Taylor Engineering Company, Limited, with the actual cost of construction of the railway; that the cost shall be ascertained by one of the Justices of the Supreme Court of the Province nominated by the Provincial Minister of Railways; that within twenty-five days from the date of the Judge's report the Dolly Varden

Mines Company shall elect whether it will pay the Taylor Engineering Company the amount found; and that if the Mines Company within the twenty-five days aforesaid pay in full so much of the actual cost of construction as shall consist of wages and within one month the full balance of the cost, the premises shall be disencumbered from the charge created by the Act, and that the time for completion of the railway shall be extended to 31st December, 1920. On the other hand, it is provided that if within the times limited the Mines Company fail to pay, then at the expiration of a month from the date of the report the premises shall vest in and become the property of the Engineering Company with a like extension of time for the railway-construction, subject, however, to certain enumerated charges, and that the full amount of the actual cost of construction so ascertained shall be paid, in the manner provided by the Act, by the latter Company to a trustee for the persons entitled; the Engineering Company, moreover, to satisfy the Minister of Railways of its ability to operate the property; all rights and privileges of the Engineering Company to cease if it fail to comply with these conditions. The net proceeds of the property in the hands of the Engineering Company are to be applied in the manner provided by the Act for payment of the statutory charges, and there is provision for inquiry for the purpose of ascertaining whether the premises are being operated with due regard to the liquidation of the charges, and, if found necessary and just, for the appointment of a receiver. The second charge is concerned with a mortgage of George Wingfield, President of the Goldfield Mines Company, of the principal sum of $150,000, and it is provided that after the expiration of eighteen months from the date when the premises shall become vested in the Engineering Company the said Wingfield shall be entitled to exercise the ordinary rights and powers of a mortgagee. The final charge to which the property is made subject in the event of its acquisition by the Engineering Company is a floating charge in favour of the Mines Company for the amount of its actual expenditure for the construction of the railway, purchase price, and development of the premises, not to exceed $613,000; and it provided that after satisfaction of the other charge the net proceeds shall be devoted in equal moities to the satisfaction of the contractors' profit and of the said charge in favour of the Mines Company.

On 17th May last an application for disallowance was received on behalf of the said George Wingfield, alleging that the Act contained provisions prejudicial to his interest, but it becomes unnecessary to consider this application, because it was about a month later withdrawn by Mr. Wingfield.

On 5th January last the undersigned received a telegram from Mr. R. T. Elliott, of Vancouver, requesting disallowance upon grounds alleging that the Act was *ultra vires* of the Legislature. Correspondence ensued as follows:—

Telegram of 4th January, 1919, from Mr. R. T. Elliott, solicitor for the Mines Company, to the Minister of Justice:

Letter of 7th January from the Deputy Minister of Justice to Mr. Elliott:

Two telegrams from Mr. Elliott to the undersigned of 15th January:

Letter of 16th January from the Deputy Minister of Justice to Mr. Elliott:

Telegram of 16th January from the Sun Publishing Co., Ltd., of Vancouver, to the Deputy Minister of Justice:

Mr. Newcombe's telegram in reply of 17th January:

Telegram of 12th February from Mr. Elliott to the Minister of Justice:

Mr. Newcombe's acknowledgment of the same date:

Telegram of 12th February from R. J. Cromie, of the Vancouver *Sun*, to the Minister of the Interior:

Mr. Newcombe's reply of 14th February:

Telegram of 16th February from Mr. Elliott to the Minister of Justice:

Mr. Newcombe's reply of 17th February:

Telegram of 17th February from Mr. Cromie to Mr. Newcombe:

Letter of 16th February from Mr. Elliott to the Minister of Justice, received 23rd February:

Letter of 17th February from Mr. Elliott to the Minister of Justice, enclosing copy of the report of Mr. Justice Clement, who was named by the Provincial Minister of Railways under the provisions of the Statute to ascertain the actual cost of construction of the railway.

Copy of the above correspondence is submitted herewith.

On 2nd February the Deputy Minister of Justice wrote the Attorney-General of British Columbia, enclosing for his consideration and any observations which he desired to submit for the information of the undersigned copies of the three telegrams which had then been received from Mr. Elliott; and he wrote the Attorney-General again on 12th February, enclosing copy of another telegram from Mr. Elliott, received in the interval.

On 2nd March the Attorney-General wrote the undersigned in reply, enclosing also copy of a memorandum prepared by the Taylor Engineering Company; copies of the Attorney-General's letter and of the said memorandum are submitted herewith.

It will be perceived that the present application for disallowance submitted on behalf of the Mines Company is concerned solely with grounds alleging in emphatic terms the invalidity of the legislation for the reason that the enactment of it was incompetent to the local Legislature, because it conflicts with the Dominion "Winding-up Act"; relates to bankruptcy and insolvency; derogates from the authority of the Governor in Council to appoint the Judges under section 96 of the "British North America Act, 1867," and is so far a complete nullity as to be incapable of having effect either inherently or by acquiescence or ratification.

On the other hand, the Attorney-General argues in effect that the Statute is concerned merely with property or civil rights or private and local matters in the Province, and does not entrench upon any Dominion power, and he maintains the authority of the Legislature to name a Commissioner for the purpose of ascertaining the cost of construction of the railway, as provided by the Act. He points out that the occasion of the legislation was an application by the Mines Company for extension of its powers to construct the railway upon a public highway, these having reached their statutory limit, and that it was in the circumstances not only within the authority, but even the duty of the Legislature to see that equitable provisions were made, and he submits that the Court is the proper tribunal for determining Mr. Elliott's objections.

It appears from the memorandum submitted by the Taylor Engineering Company that the Mines Company, as well as all other interested parties, was given full opportunity of hearing, and was duly heard, before a Select Committee of the Legislature appointed to investigate the dispute between the Dolly Varden Mines Company and the Taylor Engineering Company, Limited, and that the Committee reported substantially in favour of the legislation, which was thereupon after debate passed by the Legislative Assembly, as it is said, unanimously.

It is represented by Mr. Elliott in his telegram of 15th January that "forcible possession has been taken of all the assets and properties of the Dolly Varden Mines Company, and valuable assets have been appropriated and converted into money and constant wastages of assets are occurring. The titles to the properties have been transferred to some nominal purchaser, and Taylor Company, Limited, is in hands of trustee for creditors. Under these circumstances it is respectfully submitted that to suggest the taking of legal proceedings by Dolly Varden Mines Company is to make a mockery of justice," and he observes that the Company would be at a disadvantage in the litigation by reason of its resources having been taken out of its hands and appropriated to the adversary, from whom it is also suggested it would be impossible to recover damages or costs.

These considerations do not, however, in the opinion of the undersigned, justify the exercise of the power of disallowance upon any debatable question of legislative authority; it is manifest that if the Statute be *ultra vires*, as is so unhesitatingly affirmed on behalf of the Mines Company, it could not legally operate to justify or bring about the condition of affairs of which the Company complains; because, upon the assumption that the Company's corporate capacity continues, it has the right to resort to the judicial tribunals, which would afford a mandatory remedy against compulsory proceedings which have no legal sanction; and, on the other hand, if the Company be in difficulties because of the expiry of statutory powers affecting its constitution, that is a condition not attributable to the Act under consideration.

In these circumstances the undersigned does not consider it necessary to express an opinion upon the questions of constitutional authority which the correspondence on behalf of the Mines Company suggests, seeing that these questions are strongly maintained in the affirmative by the Attorney-General on behalf of the local Government. He considers that the questions so involved in this application may, as intimated to the Company's solicitor by the Deputy Minister of Justice on 7th January last, be "more appropriately determined by the judicial tribunals than by the executive in the exercise of the power of disallowance."

There is, however, another aspect of the case not involved with any question of constitutional validity.

The Mines Company was incorporated by the authorities of the State of Delaware, in the United States of America; it appears to have acquired certain mining property in the Province of British Columbia, and by local Act, chapter 53 of 1917, the power to construct and operate a railway for use in connection with the operation of the mines; this property, or some of it, was acquired from Daniel W. Cameron and part only of the purchase price has been paid; the property had been mortgaged in favour of George Wingfield, of the Goldfields Consolidated Mines Company, and the mortgage was outstanding; the Mines Company had contracted with the Taylor Engineering Company for the construction of the railway; considerable work had been done under this contract, but, the Mines Company having failed in its obligations, the Engineering Company was unable to complete its contract; work was stopped, and by the provisions of the said chapter 53 of 1917 the Mines Company not having its railway ready for operation before 31st December, 1918, its powers to construct and operate the railway became null and void. The Mines Company in these circumstances applied to the Legislature for renewal and extension of its former powers. It was, of course, quite competent to the Legislature to grant or to refuse this application, and, if granted, to impose reasonable conditions. The Act which resulted cannot, however, be regarded as an extension upon terms consequent upon the application of the Mines Company, because, in the event of failure of the Mines Company to discharge within a limited time the obligations in connection with the construction of the railway, it is provided that the entire property of the Mines Company in the Province, including both its mines and the railway, shall pass to the Taylor Engineering Company for the purposes provided by the Act. The situation as it stood when the Bill was under consideration by the Legislature was one which could conveniently have been considered by the judicial tribunals, which had undoubted jurisdiction to declare the respective rights of the vendor, mortgagee, and contractor, and to adjudge such remedies for recovering all the amounts payable by Mines Company as were justified by the facts and circumstances of the case. The Legislature, nevertheless, put itself in the position of the competent Court, and undertook to regulate the situation by way of a legislative measure. In the view of the undersigned this was an objectionable method of procedure, even if the power of the Legislature be not questioned. The declaration of charges and directions for the realization of property for discharge of existing liabilities are effected by judicial proceedings constitutionally entrusted to the Courts, and it is the opinion of the undersigned not desirable that the Legislature should assume the functions of a Court of justice.

The undersigned finds it unnecessary, however, to determine whether the proceedings of the Assembly were justified, either by the special circumstances of the case or by the equity of the measure which it adopted. It is represented that not only the Engineering Company, but also Mr. Cameron, the vendor, and Mr. Wingfield, the mortgagee, are opposed to the disallowance of the Act. Moreover, it was on 29th March, 1919, that the Act was assented to, and it was not until 4th January last that the undersigned received any intimation of complaint from the Mines Company. It is represented that in the interval steps had been taken under the provisions of the Act, and that the property of the Mines Company had been taken out of its hands and presumably interests have been acquired upon the foundation of the Statute. It may be observed that a period of at least twenty-five days from the date of the Judge's report was allowed for the Mines Company to elect whether it would pay to the Taylor Engineering Company the amount of the actual cost of construction, and so not only to retain its property, but also to acquire an extension of time for the construction of the railway, by providing for the discharge of its liabilities to the Engineering Company; and it would appear from the correspondence submitted that the amount has not been paid, although the cost of construction was ascertained and reported by consent so long ago as 22nd April last. In these circumstances the delay in submitting any objection suggests that the provisions of the Statute may not at the time have been regarded as unsatisfactory, and in this connection it may be reiterated that the ground for disallowance which is prominently put forward is that of legislative incompetence. But, whatever may have been the reasons accounting for the delay of the Mines Company in submitting its complaint, the undersigned apprehends that, upon just and equitable principles, where a Legislature adopts the extraordinary procedure of providing, in place of the judicial tribunals, for the administration of property in which various interests are concerned, or enacts provisions

interfering with vested rights or existing obligations, a person desiring to object to the justice of the legislative measure should move with reasonable promptitude so as to avoid responsibility by delay or apparent acquiescence for any change in consequence of which disallowance might operate prejudicially to others, who, although not the promoters of the Act, may be affected by its operation or by the proceedings authorized thereby, and the undersigned is not satisfied that in the present case disallowance might not create considerable confusion and produce loss, hardship, or injustice not less than that which it might be designed to avoid or to remedy.

Chapter 32, intituled "An Act to provide for the Settlement of Differences between the Governments of the Dominion and the Province respecting Indian Lands and Indian Affairs in the Province of British Columbia." This Act, the nature of which is briefly described by its title, provides by section 3 authority to the Lieutenant-Governor in Council for the purpose of adjusting, readjusting, or confirming the reduction, cut-offs, and additions in respect of Indian reserves proposed in the report of the Commission, and to carry on such further negotiations and enter into such further agreements, whether with the Dominion Government or with the Indians, as may be found necessary for a full and final adjustment of the differences between the said Governments.

Upon this the undersigned observes that Indians and Indian reserves are committed by section 91 of the "British North America Act" to the exclusive legislative authority of the Dominion, and that if there be occasion for negotiations between the local authorities and the Indians with respect to reserves, these should be carried on through the Government of Canada, as representing the Indians, and not with the Indians directly, and that, in so far as it be the intent of this section to authorize direct negotiations upon the subject between the Lieutenant-Governor and the Indians, the Provincial Legislature is in the opinion of the undersigned incompetent to sanction such proceedings. The undersigned apprehends, however, that it should not be presumed and probably was not the intention that the negotiations in question should be carried on with the Indians otherwise than through the Government of the Dominion, with which their affairs are constitutionally charged.

The undersigned recommends that a copy of this report, if approved, be transmitted to the Lieutenant-Governor of the Province for the information of his Government.

Humbly submitted.

(Sgd.) CHAS. J. DOHERTY,
Minister of Justice.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

FIRST ANNUAL REPORT

OF THE

DEPARTMENT OF INDUSTRIES

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

YEAR ENDING DECEMBER 31ST

1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The First Annual Report of the Department of Industries of this Province is herewith respectfully submitted.

JOHN OLIVER,

Premier.

Premier's Office,

January 21st, 1920.

DEPARTMENT OF INDUSTRIES,

VICTORIA, B.C., January 21st, 1920.

The Honourable John Oliver, Premier,

Minister of Industries, Victoria, B.C.

DEAR SIR,—In pursuance of section 9 of the "Department of Industries Act," I enclose herewith Annual Report.

Yours truly,

D. B. MARTYN,

Industrial Commissioner.

REPORT *of*
THE DEPARTMENT OF INDUSTRIES.

To the Lieutenant-Governor in Council,
Victoria, B.C.

Sir,—In accordance with the "Department of Industries Act," the following report is made. It contains:—

(*a.*) Organization:
(*b.*) Method adopted in transacting Business:
(*c.*) Summary of Applications received:
(*d.*) Loans granted:
(*e.*) Loans under Advisement:
(*f.*) Classification of Loans:
(*g.*) Financial Statement showing Disbursements from the Development Fund.

(*a.*) Organization.

The Department of Industries as at present organized consists of the Minister of Industries, the Honourable John Oliver; a Deputy Minister, known as the Industrial Commissioner, Major Donald B. Martyn; and an Advisory Council to the Industrial Commissioner acting without pay, who are: Major R. J. Burde, M.C., M.P.P., Port Alberni; F. G. Dawson, Prince Rupert; A. C. Flumerfelt, 723 Fort Street, Victoria; Joshua Kingham, 1004 Broad Street, Victoria; James H. McVety, Labour Temple, Vancouver; J. E. W. Thompson, M.P.P., Vancouver; Nicol Thompson, Vancouver.

(*b.*) Method adopted in transacting Business.

The first meeting of the Advisory Council was held on August 7th, 1919, and at this meeting a method of carrying on the business of the Department was outlined. It was decided:—

(1.) That all applications for financial aid under the "Industrial Act" be submitted to the Industrial Commissioner, who would make a full investigation on each application, and that he would make a report giving all details in respect thereto, submitting a recommendation for the consideration of the Council.

(2.) The Advisory Council would meet every and so often as it becomes necessary, at the call of the Industrial Commissioner, to pass on and consider such reports.

(3.) All applications would be considered entirely on their merits, and the amount of the loan considered necessary would be determined in each individual case without any definite percentage of the capital required being fixed as a maximum.

(4.) The Advisory Council further advised the Industrial Commissioner to refuse all applications for aid to commence retail, wholesale, or strictly commercial enterprises, and to so inform all such applicants, so that the business of the Department might be expedited and such applicants might not be put to unnecessary delay in awaiting a meeting of the Board. Under this heading a large number of applications and inquiries were received and dealt with according to the above instructions.

(5.) The rate of interest on all loans was fixed at 6 per cent. plus any additional charge that might be incurred by the Government in borrowing the money or in making the loan.

The following method has been adopted in paying out moneys in respect to all loans made to date: When all conditions as set out in the granting of a loan have been complied with, the amount of the loan is placed to the credit of the applicant in the Development Fund. When security papers have been properly executed and registered, payments are made from this fund on voucher in accordance with the purposes for which the money was loaned. In this way the Department is at all times assured that all moneys voted are being used in the development of the industry and for the purposes for which the grant was made.

The Advisory Council held meetings to pass on applications on the following dates: August 7th and 8th, 1919; October 10th, 1919; November 28th, 1919; December 5th, 1919.

The full time of the Department of Industries was occupied in considering the large number of applications received for financial assistance, many of these requiring considerable investigation and research. For this reason very little was accomplished by way of research and statistical information, as provided for in section 4, subsections (*a*) to (*f*). The Advisory Council at the present time has under advisement the investigation of tannin extract from the bark of British Columbia trees and the manufacture of fertilizer and fish by-products.

(*c.*) SUMMARY OF APPLICATIONS RECEIVED.

Total number of applications to end of December, 1919	225
Total amount applied for	$2,767,404.41
Total amount of loans approved	$442,200.00
Total amount of loans under advisement	$61,000.00
Total number of applications refused	155
Total number of applications granted	19
Total number of applications under advisement	6
Total number of applications under investigation	45

(*d.*) LIST OF LOANS APPROVED.

Name.	Industry.	Location.	Loan.	Total amount to be expended in the Industry.	Expected to employ.
Canada Western Cordage Co.	Cordage	New Westminster	$200,000 00	$300,000 00	84
Murrayville, B.C. Toy Co.	Toy-factory	Murrayville	4,000 00	8,500 00	9
Western Toy & Furniture Co.	Toy and furniture factory	Vancouver	15,000 00	45,000 00	30
Barclay Sound Fisheries	Salting and curing fish	Barkley Sound and Vancouver	10,000 00	18,000 00	11
Sunset Woodworkers	Wood-workers	Vancouver	3,000 00	6,500 00	5
Frank Beatson	Piston-rings	„	1,000 00	2,600 00	2
T. Bennett & Son	Furniture	„	5,000 00	20,000 00	17
Kerr Manufacturing Co.	Neckwear	„	2,000 00	3,000 00	5
Peerless Products	Ink and mucilage	„	1,000 00	8,500 00	3
Cut-to-Fit Buildings Co.	Homes	New Westminster	50,000 00	97,000 00	45
F. H. Hill & H. C. Lancaster	Electroplated fixtures	Victoria	1,500 00	2,700 00	3
Sidney Roofing, Paper & Refining Co., Ltd.	Building-felt, building-paper, roofing, beaver-board and box-board	Sidney	100,000 00	306,000 00	75
Canada Western Woodworkers	Furniture and woodwork	Victoria	10,000 00	26,000 00	20
H. L. Finlayson	Ladies' waists	Vancouver	2,000 00	8,000 00	10
Frank Vinall & Sons	Furniture	Victoria	1,000 00	1,000 00	3
Automobile Body Builders	Truck and auto bodies	Vancouver	1,500 00	3,200 00	8
Vancouver Pipe & Foundry Co. & Col. J. S. Tait	Cast-iron pipe, soil-pipe, etc.	„	30,000 00	50,000 00	40 to 50
Brin du Chatelet	Model-maker	Victoria	500 00	500 00	1
Alfred & Harold Eckley	Manufacturing marine engines	Vancouver	4,700 00	6,500 00	6

Total amount for new industrial development subscribed by the company and by loan from the Government $913,000.00

Total number of persons for which new permanent employment will be provided ..... 377 to 387

(*e.*) LOANS UNDER ADVISEMENT.

Name.	Industry.	Location.	Loan.	Total amount to be expended in the Industry.	Expected to employ.
J. A. Mitchell & C. McGraw	Sawmill	Merville	$ 5,000 00	$12,000 00	20
Sayward Trading Co.	,,	Sayward	5,000 00	5,000 00	10
British Pacific Paper Bag Company	Paper bags	Vancouver	25,000 00	50,000 00	15
Hiker Manufacturing Co.	Children's mechanical vehicles	Victoria	6,000 00	17,000 00	17
McBride-Wells Company	Labelling and reconditioning canned goods	Vancouver	1,000 00	1,400 00	9
Vancouver Knitting Co.	Woollen goods	,,	19,000 00	123,753 91	66

Total amount for new industrial development subscribed by the company and by loan from the Government	$209,153.91
Total number of persons for which new permanent employment will be provided	137

(*f.*) CLASSIFICATION OF APPLICATIONS.

Industry.	Number received.	Number approved.	Under Advisement.	Under Investigation.
Saw and shingle mills	20	...	2	8
Tire repair and vulcanizing shops	9	...	...	...
Tire and rubber products factories	2	...	...	...
Furniture	5	2	...	1
Boots and shoes	3	...	...	1
Toy-factories	7	1	1	...
Toy and furniture factories	1	1	...	...
Cut-to-fit buildings	1	1	...	...
Wood-workers	5	3	...	1
Iron-workers and machinery plants	4	2	...	2
Ink and stationery supplies	2	1	...	...
Neckwear	1	1	...	...
Model-making	1	1	...	...
Fish packing and curing	10	1	...	4
Other fishing proposals	13	...	...	1
Fish by-products plants	5	...	...	2
Ladies' and children's wear	2	1	...	...
Wood and coal	6	...	...	...
Trucking	5	...	...	...
Macaroni	1	...	...	...
Paper bags	2	...	1	...
Boat-building	4	...	...	4
Paint-making	3	...	...	2
Manufacture of felt and building-paper	2	1	...	...
Greenhouses and nurseries	3	...	...	1
Iron-pipe foundry	1	1	...	...
Manufacturing fixtures and electroplating	1	1	...	...
Floating dry-dock and marine ways	2	...	...	...
Manufacturing chemicals and chemical fertilizer	3	...	...	1
Box-factories	4	...	...	1
Laundries	2	...	...	...
Manufacture of jewellery	1	...	...	1
Bakery	2	...	...	...
Sale of fruit	2	...	...	...
Milk-factory	1	...	...	...
Fruit and vegetable cannery	3	...	...	2
Manufacturing various patented articles	2	...	...	1
Gloves	1	...	...	...
Cheque-protectors	1	...	...	...
Broom-handles	1	...	...	...
Electric fixtures	1	...	...	...
Glass containers	1	...	...	...
Bridge and wharf construction	1	...	...	...
Mushroom-culture	1	...	...	...
Development of mineral claims	6	...	...	1
Brick plants	2	...	...	2
School furniture	1	...	...	...
Spices and peel	1	...	...	...
Stoves and furnaces	1	...	...	1
Bee-keepers' supplies	1	...	...	...
Waterproofing-oils	1	...	...	1
Household specialties	2	...	...	1
Woollen and knitting factories	2	...	1	1
Marble-works	1	...	...	1
Book-rests	2	...	...	...
Iron and steel	3	...	...	1
Ceramic other than brick plants	1	...	...	...
Community settlement	1	...	...	...
Coke and by-product furnace	1	...	...	1
Reconditioning of canned goods	1	...	1	...
Logging	6	...	...	1
Cordage-factory	1	1	...	...
Carried forward	182	19	6	44

(*f.*) CLASSIFICATION OF APPLICATIONS—*Continued.*

Industry.	Number received.	Number approved.	Under Advisement.	Under Investigation.
Brought forward	182	19	6	44
Pulp and paper	1	...	...	...
Candy-factory	1	...	...	...
Manufacture of gent.'s clothing	1	...	...	...
Co-operative Building Co.	2	...	...	...
Lath and crate	2	...	...	1
Casket-manufacturing	1	...	...	...
Harness-making	1	...	...	...
Miscellaneous	34	...	...	...
Totals	225	19	6	45

(*g.*) FINANCIAL STATEMENT SHOWING DISBURSEMENTS FROM THE DEVELOPMENT FUND.

To T. Bennett & Sons	$ 2,685 98	By Consolidated Revenue	$50,000 00
Kerr Manufacturing Co.	2,000 00		
Frank Beatson	931 75		
Peerless Products	535 21		
Western Toy & Furniture Co.	11,546 35		
Barclay Sound Fisheries	2,134 53		
Canadian Western Woodworkers, Ltd.	3,810 44		
Murrayville, B.C., Toy Co.	4,000 00		
Balance at Dec. 31st, 1919	22,355 74		
	$50,000 00		$50,000 00

NOTE.—A comparatively small amount has been paid out to date on the loans approved, as in all cases the applicants are expending their own proportion of the capital subscribed before drawing on the Development Fund for the amount of the loan.

D. B. MARTYN,
Industrial Commissioner.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

RETURNED SOLDIERS' AID COMMISSION

ON WORK PERFORMED TO

JANUARY 31ST, 1920

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present the Report on the activities of the British Columbia Returned Soldiers' Aid Commission to January 31st, 1920.

J. D. MACLEAN,

Provincial Secretary.

March 10th, 1920.

VICTORIA, B.C., February 16th, 1920.

The Hon. J. D. MacLean, M.D., C.M.,
Provincial Secretary, Victoria, B.C.

SIR,—I have the honour to submit herewith Report on the activities of the British Columbia Returned Soldiers' Aid Commission to January 31st, 1920.

I have the honour to be,
Sir,
Your obedient servant,

F. A. ROBERTSON,
Chairman.

Report of British Columbia Returned Soldiers' Aid Commission.

The British Columbia Returned Soldiers' Aid Commission is an organization under the Department of the Provincial Secretary which renders aid in various ways to those men who have served in the late war, and also to the dependents of those who gave their lives in the service of their country. The necessity of such an organization will be appreciated when it is realized that after such a cataclysm as the world has experienced, which called for the manhood of the nation to leave their homes and civil occupations for a term of years, it was inevitable that considerable confusion would follow upon such an unheaval in the national life.

The early history of the Commission as contained in the published reports of 1916 and 1917 shows that the first activities of the various Provincial Returned Soldier Commissions throughout the Dominion were chiefly directed towards the devising of general policies relating to the re-establishment of the members of the Canadian Army and Navy on their return to civil life.

When the Commission was formed in November, 1915, the war was still in its earlier stages, and the general question of reconstruction had received little attention. It can therefore be readily understood that with the progress of time the activities of the Commission were directed along different lines as various policies regarding re-establishment were considered and finally adopted. Before giving an account of the present work of the Commission it will be of interest to recall some of the main problems that had to be confronted at the outset and note briefly how these were met.

The first question of importance was the finding of immediate employment for those men who were then returning home and who were able to work. To meet this problem local employment committees were formed in all the chief places in the Province. These local committees did much useful work not only in securing employment, but in looking after the interests generally of those men in their respective districts who were serving in the Forces. Many of these local committees have now ceased to exist, but in the majority of cases their secretaries act as representatives of the Commission.

A second problem was the providing of special or technical training for those who came home disabled and could not follow their previous occupations. A special committee of the Commission was appointed to consider the matter, but the problem was eventually solved by the Department of Soldiers' Civil Re-establishment in taking over the whole matter of vocational training.

The question of placing the returned soldiers on the land received a great deal of attention from the Commission, and in conjunction with the Returned Soldier Commissions of the other Provinces of the Dominion strong recommendations were made to the Government at Ottawa, with the result that the "Soldier Settlement Act, 1917," was brought into force, while the Provincial Government enacted the "Soldiers' Land Act" and amended certain other existing Acts, making them more favourable for the returned men.

The general question of finding employment for returned men, which originally was in the hands of the various Provincial Returned Soldier Commissions, has received considerable attention from the Federal Department of Labour, resulting in co-operation between the Federal and Provincial Governments being provided for under the provisions of the "Employment Offices Co-ordination Act, 1918," and also an Order in Council passed at Ottawa, December 17th, 1918. In conformity with the scheme of the Dominion-Provincial Employment Service, the Government of British Columbia through the Provincial Department of Labour has already established Labour Bureaus at the following places: Vancouver, Victoria, Prince Rupert, Nanaimo, New Westminster, Nelson, Cranbrook, Fernie, Kamloops, Vernon, and Kelowna. At each of these offices there are representatives of both the Provincial Government and the Soldiers' Civil Re-establishment Department.

In addition to these four main questions just explained, numerous other matters have received and are still receiving much attention from the Commission. Many returned men have found difficulties in connection with their pay, separation allowances, pensions, gratuities, etc. As the head office of the Commission has been a central information bureau and clearing-house for straightening out difficulties, all returned men are invited to write to the Commission in connection with any troubles that they may have. The services of the staff are always at the disposal of such men, and the Commission, acting in the nature of an official friend, has

been instrumental in straightening out many tangles. In this connection mention should be made of the great amount of similar work being done by the Information and Service Branch of the S.C.R. and also by the various returned soldier organizations.

During the greater part of the present year a great deal of routine work was entailed by the efforts of the Commission to keep in touch with the great numbers of men returning to Canada. Upon the arrival of troop-ships from overseas the Commission was advised by wire by the military authorities at the ports of disembarkation of the names and destinations of the returning soldiers and also the addresses of their next of kin. This information was then relayed by mail or telegram throughout the Province to the places and parties interested.

During most of the period of demobilization a representative of the Commission met the troop-trains to this Province while en route, and gave to the men just returning such general information as they required. In this way most of the men, upon arrival at their destinations, were aware of the various regulations in force *re* pay, clothing allowance, gratuity, etc., and so the work of demobilization was greatly facilitated.

RELIEF.

It can be readily understood that with the progress of time the nature of the work of the Commission has necessarily changed. The demobilization of the Canadian Army is now practically an accomplished fact and attention should now be directed towards re-establishment. This, of course, is mainly a Federal question, and much has already been done by the Department of Soldiers' Civil Re-establishment and other organizations, as has already been mentioned.

It was realized by the Provincial Government that in the necessary confusion immediately following demobilization there would undoubtedly be among the returned men and dependents of men who have been killed in the war a number of cases of urgent need, caused through exceptional circumstances, that could only be relieved by some sort of financial assistance. Consequently, at the last session of the Provincial Legislature a vote of $250,000 was passed for patriotic purposes, and it was intended that this Commission should endeavour to grant such relief as each individual case merited.

It is not the policy of the Government or the Commission to undertake the whole burden of this relief-work throughout the Province. The fund set apart for that purpose would not last very long unless the work of the Commission were considered as supplementing voluntary subscriptions and local effort. Various allowances are made by the Canadian Patriotic Society and other organizations for relief. The policy of this Commission has been to grant relief when deserving only in such cases as are not provided for in any other way; in other words, to fill up the crevices that are left by other existing regulations.

In addition to granting direct financial assistance for relief, the Commission has endeavoured to co-ordinate the work of all existing relief organizations to prevent overlapping and to bring together the various agencies in a community that have as their aim the re-establishment of the returned soldiers in civil life. Letters were sent to the head office of the S.C.R. in the Province and also to soldier organizations, calling attention to the activities of the Commission and requesting that the information be brought to the attention of the various branches of these organizations throughout the Province. In this way co-operation has been secured which has been beneficial to all concerned.

In Victoria the Commission works harmoniously and in active conjunction with the Information and Social Welfare Branch of the S.C.R., also the Canadian Patriotic Aid Society, the Federated Service Council, and all soldier organizations. In Vancouver a similar policy is adopted with satisfactory results. In this connection special mention should be made of the Returned Soldiers' Club, which occupies the premises of the old Elysium Hotel. Rooms and meals are provided below cost, and in addition their Emergency Fund has been responsible for the relief of a great deal of distress amongst the returned soldiers. The Commission's representative in Vancouver, Mr. G. C. Hodge, has an office in the Court-house, and the present amicable working arrangement there is largely responsible for the satisfactory solution of the problem of giving relief in deserving cases without undue overlapping and waste of effort. In New Westminster all relief organizations are represented on a Central Committee, the Chairman of which is the President of the local Canadian Patriotic Branch and is also a member of the Commission. The Secretary is the local representative of the Commission and the arrangement works most satisfactorily.

In connection with this relief-work the hands of the Commission have not been tied by unnecessary red-tape. When urgent aid is required it is given promptly. Furthermore, the work is not carried out in any spirit of charity, as it is realized that in most instances the exceptional circumstances are due either directly or indirectly to a man's service in the war. However, no aid is recommended unless the applicant is willing and anxious to do everything possible to help himself, as it must be admitted by all that the sooner the discharged soldier is in a position to rely completely upon himself again, the better it will be both for the individual and the community.

Although numerous applications have been received from men who ask for an advance of capital to enable them to re-establish themselves in various lines of business, the funds of the Commission have not, unless in very exceptional instances, been devoted to such purpose. Not only is our fund inadequate to meet such demands, but we have not the organization or the machinery that would be necessary to handle securities. This however, is a feature of re-establishment that the Commission in conjunction with other bodies has urged upon the Federal Government to adopt.

Statement of Relief Expenditures to January 31st, 1920.

Total amount expended	$44,616 02
Returned on above	2,150 39
Balance	$42,465 63
Number of applicants receiving aid	950
Average amount to each, approximately	$47 00

Classification.—For general information the following classifications, which have been estimated from the office records, are submitted as pertaining to the various applicants to whom aid has been granted:—

(*a.*) Various reasons for granting aid:
(*b.*) Family status of applicants:
(*c.*) Sources from which information obtained:
(*d.*) Provinces in which applicants enlisted:
(*e.*) Branches of service:
(*f.*) Places of service.

(*a.*) Reasons for granting aid—	No. of Cases.	Total Amount advanced.
Illness in family	385	$17,255 00
Maternity cases	50	2,902 00
Desertions	12	2,714 00
Unemployment	235	5,988 00
Men on strength of S.C.R. for vocational training or treatment awaiting payment of allowances	30	990 00
Men or dependents awaiting overdue pension or war service gratuity cheques	60	2,927 00
Land settlers in absolute need of necessities	28	1,447 00
Death in family	14	1,008 00
Purchase of clothing	70	1,255 00
Miscellaneous	66	8,130 00
Totals	950	$44,616 00
(*b.*) Family status of applicant—		
Married	747	$29,074 00
Single	97	2,818 00
Widows	79	8,816 00
Widowers	9	856 00
Deserted wives	10	2,514 00
Orphan children	8	538 00
Totals	950	$44,616 00

	No. of Cases.	Total Amount advanced.
(*c.*) Case reported to Commission by—		
Great War Veterans' Association	176	$ 7,446 00
Army and Navy	40	3,212 00
Comrades of the Great War	28	1,120 00
Imperial Veterans' Association	185	6,495 00
Department of S.C.R.	57	4,434 00
Other organizations	63	3,150 00
Vancouver office of Commission	252	10,277 00
Representatives of Commission throughout the Province	76	5,105 00
Sundry (including personal applications to Victoria office of Commission	73	3,377 00
Totals	950	$44,616 00
(*d.*) Province in which applicant, or soldier on whom applicant was dependent enlisted—		
Nova Scotia	3	$ 135 00
New Brunswick	2	65 00
Quebec	12	835 00
Ontario	37	1,568 00
Manitoba	24	1,358 00
Saskatchewan	5	210 00
Alberta	49	1,909 00
British Columbia	790	37,320 00
Unknown (Imperials)	28	1,216 00
Totals	950	$44,616 00
(*e.*) Branch of the Forces in which applicant, or soldier on whom applicant was dependent, served—		
C.E.F.	750	$35,544 00
Imperial	168	7,844 00
Navy	32	1,228 00
Totals	950	$44,616 00
(*f.*) Where applicant, or soldier on whom applicant was dependent, saw service—		
France	828	$39,789 00
England	63	2,101 00
Canada	32	1,468 00
Unknown	27	1,258 00
Totals	950	$44,616 00

ADVANCES ON GRATUITIES.

In a number of instances advances have been made to men on their gratuities. This practice is not generally encouraged, as it is realized that the military regulation providing the payment of gratuities in monthly instalments is a wise one, as these payments coming in monthly help to secure living expenses during the interval between the date of a man's discharge and the time he establishes himself in some form of permanent employment. Many applications for advances on gratuities in lump sums have been made by men before taking employment. These we have had to generally refuse until such time as the applicant found employment.

However, in a great number of cases, the obtaining of gratuities in lump sums has been of material assistance in helping men to re-establish themselves either in business or on their own account, or to help furnish their homes. In short, whenever it can be shown that the obtaining of this gratuity in a lump sum, or a portion of it, would be a decided advantage to any discharged man, the advance is granted.

By a working arrangement with the Military Pay Office the applicant signs a letter authorizing the Pay Office to forward his cheque to this office. He also signs a power of attorney, so that when these gratuity cheques are received on their due dates they can be cashed and credited to our own bank account. In making these loans no discount rates are charged.

Up to the end of January, 1920, there has been advanced in this way on gratuities a total sum of $305,496.10, a considerable portion of which has since been returned. The number of returned men to whom advances have been made is 1,269, the average to each being $240.

Statement of Advances on War Service Gratuities to January 31st, 1920.

Total amount advanced to January 31st, 1920	$305,496	10
Amount returned on above to January 31st, 1920	228,796	24
Balance outstanding	$ 76,699	86
Purposes for which money was advanced—		
To start business		349
To purchase tools and equipment to enable men to follow previous vocation		22
Emergency advances to tide over short periods of financial difficulties		104
Advances made to men on account of domestic troubles, principally illness		104
Confinement cases		22
Deaths		5
To get married		10
To enable students to continue studies		7
Settlers on land or in homes—		
Ten per cent. payment under S.S. Board		16
Payments on property and taxes on property owned previous to enlistment		62
Purchasing home		85
Furnishing home		206
Equipment, transportation, and general expenses in connection with settling on land		58
General business purposes		19
Transportation—		
To employment		107
To homes outside of Canada		63
Bringing dependents to British Columbia		26
Sending dependents to Old Country		4
Total number of men receiving advances		1,269

PERSONNEL OF COMMISSION.

The Commission was reorganized by Order in Council in November, 1919, and is at present composed of the following members, whose services, with the exception of the Chairman and the Secretary, are given without remuneration:—

Honorary Chairman	The Hon. J. D. MacLean, Provincial Secretary.
Chairman	Major F. A. Robertson, D.S.O.
Secretary	Geo. F. Pyke.
Members—	
Major W. B. Shaw	Victoria.
H. J. Young	„
T. M. Harnett	Vancouver.
W. J. Blake Wilson	„
H. L. W. Tupper	New Westminster.
Rev. A. E. Vert	„
Captain A. Leighton	Nanaimo.
Dr. G. B. Brown	„
Lt.-Col. S. P. McMordie	Prince Rupert.

The first meeting of the Commission as above constituted was held on December 10th, 1919. A report was submitted by the Chairman outlining the work of the Commission up to the end of November, 1919. The general policy followed in the administration of relief, etc., was unanimously approved.

It was pointed out that in certain cases financial assistance was urgently needed by some of those returned men who had taken up land under the Soldier Settlement Board. A wire was immediately dispatched to the Chairman of the S.S.B. at Ottawa, urging that steps be taken to ensure that such aid could be provided for through the new Federal Emergency Fund of $40,000,000, arrangements for the disbursal of which were then being made through the Canadian Patriotic Society. We are glad to say that such an arrangement has since been effected.

Discussion on matters of general policy in connection with re-establishment resulted in the drafting of two resolutions which were unanimously approved, and which are herewith reproduced:—

(1.) *Re* aid to those men who wish to establish themselves in business other than farming: "*Resolved*, That the Federal Government be requested to enact legislation along the lines of the Soldier Settlement Board, to provide capital at a low rate of interest for those returned soldiers who wish to establish themselves in various businesses or industries."

(2.) *Re* extension of vocational training: "Inasmuch as the Federal Government has recognized the necessity of specially caring for soldiers who joined the Forces under the age of eighteen years; and inasmuch as vocational training has been provided in such cases; and inasmuch as the education or training of large numbers of soldiers was interfered with and retarded by their devotion to duty; and inasmuch as the observation of this the British Columbia Returned Soldier Commission reveals the fact that an altogether unfair burden is being placed upon these men by refusing to grant to such men any measure of assistance towards rehabilitating themselves by completing their training or education; and inasmuch as it is not in the best interests of this country that such men should be added to the army of unskilled labour: Be it *Resolved*, That the Federal Government be approached with a view to having the age restriction removed, so that each and every soldier who can show that his opportunity to educate himself to fill the place to which his natural bent and inclination inclined him has been so retarded shall be given an opportunity to complete such education or training with the assistance of the Federal Government, either by a free grant or by a partial grant and partial loan; provided always that such continuation of education or training shall be under the supervision of the Federal Government."

Copies of the above resolution were forwarded to the other Provincial Returned Soldier Commissions throughout Canada, also to the various returned soldier organizations, requesting co-operation, and it is hoped that such recommendations will not be without effect.

General Conditions.

The Chairman of the Commission during the past year visited various parts of the Province to ascertain at first hand the condition of affairs as they related to the returned soldiers. On these trips public meetings were frequently addressed by him, partly to acquaint the public with the work and scope of the Commission, and also to help foster a spirit of co-operation amongst all those who could in any way help in the task of reinstating Canada's returned soldier citizens.

Generally speaking, employers of labour were found to be willing and anxious to co-operate as far as possible in this task, and it was almost an invariable rule that the returned men themselves did their part in taking hold of their new duties with a vim and determination which convinced employers that it was to their own best interests to give these men every possible chance to re-establish themselves.

It is gratifying to report, also, that outside of the Coast cities very little distress was found to exist amongst the returned soldiers throughout the Province. This was chiefly because there were very few men out of employment. Such deserving cases as were brought to his attention were promptly granted assistance. One could not but conclude that returned men who were anxious to re-establish themselves in civil life again would find better opportunities if they could get away from the congested centres, such as Vancouver and Victoria.

In conclusion, it should be remembered that everything that is attempted in the way of re-establishing the returned men must be based upon a sympathetic understanding of their position. Any one who leaves his customary business for even a few months can realize that it is difficult to resume immediately the normal routine of business. How much harder to settle down must it be for those thousands of young men who at the most restless period of life were transferred for a number of years to entirely new scenes, with new experiences and new objects in life. Added to this is the nervous strain occasioned by the ordeals of battle, hardships, and

a generally strenuous life. Life in the Army during the war was hard, oftentimes demanding the utmost limit of physical and mental endurance. Yet our gallant boys withstood temptation and conquered all difficulties. Their achievements have gained for the whole nation a measure of glory and world status that could not be purchased with the whole money resources of the country.

It is inevitable that when the returned soldier seeks to resume the normal life of peace-times he will meet many difficulties and discouragements. It is then that he will need sympathetic counsel and real encouragement. If, therefore, we have faith in the high average character of our soldiers, then let no man feel himself entitled to "live unto himself" until the defenders of his country have been given a chance to succeed in these new battles of civil life just as they successfully fought their way through all obstacles on the battle-fields of Europe.

Local Committee List.

F. J. R. Whitchelo, Pres., G.W.V.A.	Abbotsford.
The Reeve of the District of Kent	Agassiz.
A. M. Wastell, Sec., R.S.E.C.	Alert Bay.
J. M. Wright	Armstrong.
H. P. Christie, Sec., R.S.E.C.	Ashcroft.
J. A. Fraser, Government Agent	Atlin.
L. A. Dodd, Gold Commissioner	Barkerville.
Chas. Tucker, Dominion Constable	Bella Coola.
R. M. Edgar, Sec., Burnaby Soldiers' Welcome Home Committee	411 Pender Street, Vancouver.
A. Leslie Coote, Pres., G.W.V.A.	Chilliwack.
The Reeve of Surrey	Cloverdale.
E. Henderson, Sec., R.S.E.C.	Coldstream, Vernon.
Robt. Newman, Sec., R.S.E.C.	Coquitlam Branch, Maillardville.
G. R. Bates, Sandwick	Courtenay.
W. A. Nisbet, Sec., R.S.E.C.	Cranbrook.
C. J. Bunbury, Sec., R.S.E.C.	Cumberland.
A. de R. Taylor, Sec., R.S.E.C.	Delta Branch, Ladner.
James Greig, Sec., R.S.E.C.	Duncan.
R. R. Gibbs, Sec., R.S.E.C.	Enderby.
G. H. Pullen, Sec., R.S.E.C.	Esquimalt.
J. Brown, Government Agent	Fairview.
Joseph Austin, Sec., R.S.E.C.	Fernie.
N. H. A. Parker, Sec., R.S.E.C.	Fraser Mills.
Wm. Mouat, Sec., R.S.E.C.	Ganges Harbour, Saltspring Island.
H. V. Dartt, Sec., R.S.E.C.	Golden.
F. R. S. Barlee, Sec., R.S.E.C.	Grand Forks.
G. B. Taylor, Sec., R.S.E.C.	Greenwood.
Wm. Ansell, Box 32	Haney.
J. W. Morrison, Sec., R.S.E.C.	Hazelton.
G. P. Jones, Chairman, Hedley Patriotic Commission	Hedley.
John How, Sec., G.W.V.A.	Kamloops.
J. W. Jones, Sec., R.S.E.C.	Kelowna.
W. H. Lembke, Sec., R.S.E.C.	Kerrisdale, Point Grey.
N. A. Morrison, Sec., R.S.E.C.	Ladysmith.
F. Macpherson, Sec., R.S.E.C.	Langley Branch, Murrayville.
Samuel Gibbs, Sec., R.S.E.C.	Lillooet.
J. H. Anthony, Pres., R.S.E.C.	Lytton.
James Gibson, Sec., R.S.E.C.	Matsqui.
T. Watt	Merritt.
J. A. Barr, Sec., R.S.E.C.	Mission City.

LOCAL COMMITTEE LIST—*Continued.*

J. J. Cottle, Sec., R.S.E.C.	Nanaimo.
R. G. Joy, Sec., R.S.E.C.	Nelson.
W. J. Mackenzie, Sec., R.S.E.C.	New Hazelton.
T. J. Thomas, Sec., R.S.E.C.	New Westminster.
L. Watts Doney, Sec., R.S.E.C.	North Vancouver.
A. H. Cutbill, Sec., R.S.E.C.	Peachland.
John Power, Sec., R.S.E.C.	Penticton.
His Worship Mayor Matheson	Phoenix.
Clerk of the Pitt Meadows Municipality	Pitt Meadows.
Fred Street, Sec., R.S.E.C.	Port Alberni.
L. S. Davies	Port Coquitlam.
J. J. Lye, Sec., R.S.E.C.	Port Moody.
Geo. R. Fisher, Sec., R.S.E.C.	Prince George.
Chas. L. Youngman	Prince Rupert.
P. W. Gregory, Sec., R.S.E.C.	Princeton.
Edgar C. Lunn, Government Agent	Quesnel.
His Worship Mayor McKinnon	Revelstoke.
M. MacKenzie, Sec., R.S.E.C.	Rossland.
S. M. McGuire, Sec., G.W.V.A.	Salmon Arm.
W. E. Gomm, Sec., R.S.E.C.	Sandon.
W. H. Dawes, Sec, R.S.E.C.	Sidney.
D. Cochrane, Sec., R.S.E.C.	Skidegate Inlet, Queen Charlotte City.
E. Graham, Sec., R.S.E.C.	Slocan City.
Captain R. L. Gale, Pres., G.W.V.A.	Smithers.
W. Scott Simpson, Indian Agent	Telegraph Creek.
J. Kircaldy, Pres., G.W.V.A.	Terrace.
E. F. Tregoning, Sec., R.S.E.C.	Trail.
T. M. Harnett, Manager, Returned Soldiers' Club	1140 Pender Street W., Vancouver.
E. A. Mitchell, Sec., R.S.E.C.	Vanderhoof.
Geo. W. Ross, Sec., R.S.E.C.	Vernon.
The Reeve of Summerland	West Summerland.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

PROVINCE OF BRITISH COLUMBIA

FIRST REPORT

OF

THE PROHIBITION COMMISSIONER

FOR THE

YEAR ENDING DECEMBER 31ST

1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to submit herewith the Report under the "Prohibition Act" for the year ended December 31st, 1919.

J. W. DE B. FARRIS,

Attorney-General.

March 17th, 1920.

OFFICE OF THE PROHIBITION COMMISSIONER,

VICTORIA, B.C., March 1st, 1920.

The Honourable J. W. de B. Farris,

Attorney-General, Victoria, B.C.

SIR,—I have the honour to submit my report under section 56 of the "British Columbia Prohibition Act" for the year ended December 31st, 1919.

I have the honour to be,

Sir,

Your obedient servant,

J. SCLATER,

Prohibition Commissioner.

BRITISH COLUMBIA PROHIBITION ACT.

REPORT BY THE COMMISSIONER.

(1.) Liquor Sales.

A statement of the sales of liquor made by each Vendor during the year is shown in Appendix No. 1. The kind and quantity of the various liquors sold are shown in Appendix No. 2.

(2.) Prosecutions.

A list of convictions obtained throughout the Province for infractions of the Act is shown in Appendix No. 3 (not printed). As far as the returns received in this Department disclose, the following is a summary of the various infractions of the Act included in the list of convictions:—

Number of prosecutions—		
For selling liquor		89
Having liquor in possession		663
Against doctors		9
Against druggists		5
Against breweries		11
General infraction of Act		51
Not stated		68
		896
Number of convictions		805
Number of cases dismissed		91
Fines and forfeitures—		
Total amount of fines imposed	$54,659 00	
Bail forfeited	5,650 00	
Bonds estreated	9,000 00	
	$69,309 00	
Sentences—		
Sentences imposed without option of fine		50
Total duration of above		29¼ years.

The returns made to this Department during the year under section 45 of the Act were far from complete. Under this section Justices are required to forward only certificates of conviction, which would not provide the information I have to report under section 56 (*b*), which calls for a list of prosecutions. I was therefore compelled to obtain most of the information as to prosecutions submitted herewith from Chiefs of Police throughout the Province. In order to provide a means of collecting this information in future, it is recommended that section 45 be rescinded, and that an amendment to the Act be passed to have Chiefs of Police of all cities and municipal districts send in monthly reports to the Commissioner, showing all prosecutions taken under the Act, with date of trial, name of accused, nature of charge, disposition of each case, and name of presiding Magistrate; the Superintendent of Provincial Police to render a similar report monthly of all prosecutions taken by his constables in the unorganized districts.

Prosecutions for Illegal Sale of Liquor.—Under section 28 (1) of the Act, the penalty upon a conviction for selling liquor is imprisonment, with hard labour, for not less than six months and not more than twelve months, *for a first offence*, without the option of a fine. After a close study of the effect of this penalty the Commissioner can only state that in his opinion the severity of the penalty is thwarting the very purpose it was intended to serve—viz., to prevent the illegal sale of liquor by the conviction and punishment of those who engage in this unlawful practice. There would appear to be ground for believing that more convictions would be obtained if Magistrates had the option of imposing a fine for the first offence, and, in default of payment, imprisonment, as is done in other Provinces, with better results in enforcing the law in this respect throughout this Province.

(3.) GENERAL INFORMATION.

(1.) *Industrial and Steamship Permits.*—(Issued under section 14, subsection (2*a*).) During the year 323 permits were issued, viz.: (*a*) To persons in charge of a manufacturing or industrial establishment, 232; (*b*) to masters of steam or passenger ships, 91.

When the present Prohibition Commissioner was appointed (January 23rd, 1919) it was found by him that permits under this section had been issued without any date of termination or without any provision being made for showing on the permits the quantity of liquor obtained on each. It was considered that the issue of permits in this form was, to say the least, inadvisable, as no clear record could be obtained of the use made of them without much labour in searching through the reports sent in by druggists and vendors. Accordingly, all permits of this nature were called in, and new permits, terminating on December 31st, 1919, were issued, which were numbered consecutively and recorded in a book started for that purpose, and at the same time instructions were issued to druggists and vendors that each sale of liquor on such a permit had to be filled in on the back of each one at the time of sale, with the name of the person making the sale, as well as showing the number of the permit on the reports of sales made to this office. By this means a record of the use made of each permit was made possible. In every instance of seemingly undue use of the permit in obtaining liquor inquiries were instituted, and in several instances, when the explanation given was not considered satisfactory, the permits were withdrawn and cancelled. It is doubtful if the issue of these permits should be continued without discretionary power being given to the Commissioner to refuse a permit in instances in which it is considered unnecessary or inadvisable to issue one, such as to individuals in cities where first aid can be readily and quickly obtained, or to persons in charge of establishments where the risk of injury by accident is slight, or where the number of persons employed is small. Indeed, in view of the requirements of the Workmen's Compensation Board as to the installation of first-aid equipment in all manufacturing or industrial establishments of any size throughout the Province, it is very questionable if there is any real need for the issuance of any permit to obtain and keep liquor in case of accident or emergency, especially in view of the great number of such establishments who do without it. It is recommended, therefore, that the issue of these permits be rescinded.

(2.) *Permits to Hospitals to keep Liquor.*—(Issued under section 14, subsection (2).) A certain number of permits to hospitals had been issued by the former Commissioner on a typewritten form, but no clear record had been kept of these. Accordingly, the provisions of this section were brought to the notice of the person in charge of every hospital throughout the Province. The permits that had been issued were recalled, and new permits, which were printed and numbered consecutively, were issued to all hospitals requiring same. Ninety-seven permits were issued during the year 1919.

(3.) *Permits for Alcohol to Manufacturers of Pharmaceutical Preparations, etc.*—(Issued under section 14, subsection (9).) These have been issued for limited quantities as required from time to time, principally to druggists and manufacturing chemists, 198 permits being issued during the year. Care has been taken to see that all applications under this section have been for *bona-fide* purposes before permits were issued. Under section 7, subsections (1*a*) and (3), alcohol not exceeding in quantity 10 gallons at any one time may be purchased upon an affidavit that the alcohol is required for manufacturing, mechanical, or scientific purposes only (Form A of the Regulations). It is recommended that this be rescinded, and that, instead, alcohol for the above-mentioned purposes also be obtained upon a permit from the Commissioner as in section 14, subsection (9), and that all persons obtaining alcohol under permit be required to render reports showing for what purpose the alcohol has been used when demanded by the Commissioner.

(4.) *Price-list of Liquors sold by Government Vendors.*—The prices at which the various liquors authorized to be kept by Government Vendors are sold have been fixed from time to time by Order in Council. On account of the ignorance and misunderstanding as to these prices which existed throughout the Province at the time the present Commissioner took charge of the Department, causing much unnecessary trouble and correspondence in the Government Liquor Stores, it was deemed necessary to issue a printed price-list of liquors so that druggists, physicians, and others, residing outside of the two large Coast cities of Vancouver and Victoria, requiring to send by mail applications and prescriptions for liquor, might know just what amount of cash to remit in each instance. Accordingly, this list was printed and issued as at April 1st, subsequent correc-

tions being printed and issued from time to time as circumstances required. A similar practice has been followed in the Province of Alberta.

(5.) *Physicians' Prescriptions for Liquor.*—Appendix No. 4 shows the total number of prescriptions for liquor issued by physicians during the year. Pursuant to the amendment to section 7, subsection (6), of the Act passed at the last session of the Legislature, an Order in Council was approved on April 26th, 1919, providing for the adoption of a printed form of prescription to be issued to physicians, to come into force on June 1st, 1919. Accordingly, a form of prescription was printed complying with the interpretation of a "prescription" in section 2 of the Act. All physicians in the Province qualified to prescribe liquor were duly notified of this regulation, and these printed forms of prescription have since been issued by this Department, a record being kept of all prescriptions so issued. Towards the end of the year it was discovered that attempts were being made to counterfeit these forms, and steps were immediately taken to have a special watermarked paper manufactured, on which these prescription forms could be printed, which would prevent, or at least render extremely difficult, any attempt at counterfeiting being made successfully. Government Vendors, druggists, Chiefs of Municipal and District Police, as well as Provincial Police, were notified to be on the watch for and to deal with any attempts to obtain liquor on counterfeit prescription forms. Although in spite of these precautions some counterfeit forms were presented to and accepted by druggists in Vancouver, the activity of the police and the steps taken to educate the druggists how to detect counterfeits prevented any great use being made of these, and eventually put a stop to it. The difficulty of proving guilty knowledge on the part of persons presenting these counterfeits, which the Police Magistrate of Vancouver decided was essential in a case tried before him in December, in order to obtain convictions against these persons, made the task of the police in dealing with this situation rather difficult.

In connection with prescriptions for liquor the following recommendation is submitted for consideration:—

That amendments be passed to the Act:—

(*a.*) Making it an offence to traffic in prescriptions, or for any person other than a physician to give or sell a prescription to another person, and putting on the person presenting the prescription the onus of proving that it was lawfully in his possession, with a heavy penalty for contravention:

(*b.*) Fixing a definite limit to the quantity of alcohol, spirits, wine, or malt liquors that may be prescribed by any physician to any one person at one time:

(*c.*) Fixing a definite limit to the number of prescriptions for liquor that any one person may obtain in any one week:

(*d.*) Making it compulsory on physicians to fill in the particulars required on the stubs of the prescription forms at the time the prescription is written; these stubs to be kept for six months and to be produced for inspection on the demand of the Commissioner or any agent appointed by him in writing for the purpose:

(*e.*) Fixing the maximum number of prescriptions for liquor (exclusive of alcohol) that may be issued by any one physician in any one month (*see* letter dated July 21st, 1919, from the Registrar of the Council of the College of Physicians and Surgeons of British Columbia):

(*f.*) Making prescriptions for liquor not presented to a druggist or a Government Vendor within forty-eight hours after being issued by a physician, or mailed within that time by any person residing at a distance of more than five miles from the nearest drug-store or Vendor's store, illegal, and the giving or selling of liquor to the person presenting such prescriptions an offence.

(6.) *Reports by Druggists.*—(Under section 14, subsection (7).) It was difficult at first after the appointment of the present Commissioner to obtain reports promptly from druggists as required by the regulations, and after due notice had been mailed to every registered druggist in the Province that reports must be rendered promptly, a charge was laid against a firm of druggists in Vancouver who had failed to comply therewith, as a final warning in this respect, a conviction being obtained. Since then reports have been received more regularly.

The following recommendation is submitted for consideration:—

That amendments to the Act be passed:—

(*a.*) Making it necessary for all prescriptions for liquor or alcohol honoured by druggists to accompany their reports each month to the Commissioner:

(*b.*) Fixing the maximum quantity of liquor, exclusive of alcohol, that any druggist may purchase from a Vendor in any one day or keep on his premises:

(*c.*) Making a druggist obtain all alcohol required by him upon a permit from the Commissioner; section 7, subsection (1*b*), to be amended accordingly:

(*d.*) Making druggists sell liquor only in sealed bottles as received from the Government Vendor, and at prices to be fixed from time to time by Order in Council.

(7.) *Selling of Beer containing not more than 2½ per Cent. of Proof Spirits.*—In this connection it is recommended for consideration:—

That amendments to the Act be passed:—

(*a.*) Compelling breweries to label bottles containing beer manufactured and sold by them with a distinctive label showing the name of the brewery or brewing company, place where beer was brewed, and the alcoholic contents:

(*b.*) Making it illegal for any person to sell beer in bottles that are not so labelled:

(*c.*) Compelling breweries to show clearly on barrels containing beer that may be manufactured and sold by them the name of the brewery, place where beer was brewed, and the alcoholic contents:

(*d.*) Making it illegal for any person to sell beer from barrels not so marked:

(*e.*) Making a certificate of any Provincial or City Analyst prima facie evidence under section 36A of the Act.

(8.) *Sale of Extracts.*—General complaints have been made against the sale of extracts containing a very high percentage of alcohol, which are mixed with beer and other liquids for beverage purposes, producing violent intoxication in those drinking these mixtures. The extracts referred to comprise extract of ginger, extract of lemon, and Hoffmann's Drops, which appear to be those most generally used. It is very desirable that the sale of these extracts and others of a like nature be restricted in every possible way. The passing of legislation that would prohibit the sale of these, except in drug-stores, is recommended for consideration, and only by druggists under regulations providing for the restricted sale for household use by well-known residents, with a complete record of each sale being kept and sent in to this Department monthly.

(9.) *Liquor Warehouses for Export Sale of Liquor.*—(Under section 19.) All liquor warehouses under this section were regularly inspected during the year, but owing to the Order in Council of the Dominion Government being in effect throughout the year, prohibiting the importation of liquor into Canada, no liquor was received into or delivered from these warehouses during the year.

(10.) *Purchase and Supply of Liquor for Government Stores.*—The purchase of all liquor for the Government Liquor Stores since the present Commissioner's appointment has been made by the Purchasing Agent of the Government upon requisition duly approved by the Commissioner. Up to July 31st the Vendors at Vancouver and Victoria made these requisitions for their respective stores. On August 1st a liquor warehouse was established in Vancouver for the receipt of all liquor purchased and the distribution to the Vendors of all liquor required by them. From August 1st all requisitions for the purchase of liquor were issued by the Manager of the Liquor Warehouse. All liquor is sold by the Vendors just as it is received by the Government; no blending, mixing, or reducing of any kind is permitted. While it has been difficult at times to maintain a supply of liquor sufficient to meet the demands made upon the Vendors from day to day, which kept increasing towards the end of the year to an extent quite unlooked for, yet the unexpected and difficult situation this created was met by the Purchasing Agent with commendable judgment. Every effort was made by him to obtain a supply of liquor for medicinal purposes of well-known brands of manufacture, as far as these were available and could be purchased, both in Canada and abroad, at reasonable prices and without undue delay. Any shortcomings in maintaining liquor-supplies were due to circumstances which could not be provided against. The past year has been a very strenuous one for the Commissioner, the Purchasing Agent, and the employees of this Department.

J. SCLATER,
Prohibition Commissioner.

Parliament Buildings, March 1st, 1920.

APPENDICES.

APPENDIX No. 1.

GOVERNMENT LIQUOR VENDOR'S DAILY SALES.

Month.	Vancouver.	Victoria.	Nanaimo.	Prince Rupert.	Cranbrook.	New Denver.	Quesnel.
January	$48,476 13	$11,808 56	$1,079 25	$20 00*	$479 15*	$616 65*	$110 50*
February	51,498 64	12,826 05	1,300 50	18 00*	21 77*	117 75*	137 00*
March	69,258 98	14,376 80	1,988 50	50 00*	376 00*	.....	86 75*
April	61,497 54	12,562 05	2,190 50	10 00*	388 25*	.....	14 00*
May	86,235 43	15,342 71	2,465 00	.....	16 00*	.....	10 70*
June	52,102 88	14,654 54	1,081 25	.....	.....	.....	.....
July	75,363 29	18,997 03	1,107 30	.....	.....	.....	.....
August	101,899 57	23,799 57	1,890 75	.....	.....	.....	.....
September	126,447 78	31,951 85	2,535 25	.....	.....	.....	.....
October	166,629 00	38,758 90	3,131 00	.....	.....	.....	.....
November	170,803 05	38,973 75	3,717 00	.....	.....	.....	.....
December	247,650 12	62,130 60	5,656 75	2,944 70	.....	.....	.....
Totals	$1,257,862 41	$296,182 31	$22,486 30	$2,944 70	.....	.....	.....

* Included in Vancouver.

Total sales, $1,579,475.72.

APPENDIX No. 2.

APPROXIMATE AMOUNT OF LIQUOR RECEIVED AND SOLD DURING 1919.

Liquor.		Received.	Sold.
Brandy	gals.	5,786	5,420
"	cases	1,000	818
Alcohol	gals.	5,618	4,313
Gin	gals.	830	508
"	cases	500	265
Scotch Whisky	gals.	9,301	9,051
"	cases	9,876	8,323
Irish Whisky	"	1,099	1,085
Rye Whisky	gals.	26,878	25,380
"	cases	8,600	8,767
Rum	gals.	12,805	12,281
Sherry	"	840	445
Port	"	1,742	1,362
Champagne	cases	45	35
Stout (imported)	doz. quarts	288	48
"	doz. pints	1,830	105
"	doz. splits	634	325
Ale (imported)	doz.	80	12
"	bbls.	6	6
Beer (local)	doz.	484	446
Stout (local)	"	30	30
St. Augustine Wine		106	47

APPENDIX No. 4.

TOTAL NUMBER OF PRESCRIPTIONS FOR LIQUOR HONOURED AT GOVERNMENT LIQUOR VENDORS' STORES AND DRUG-STORES THROUGHOUT THE PROVINCE DURING THE YEAR ENDING DEC. 31ST, 1919.

Prescriptions issued by Vancouver doctors	181,350
Prescriptions issued by Victoria doctors	54,732
Prescriptions issued by doctors in other places	79,095
Total	315,177

STATEMENT OF PRESCRIPTIONS FOR LIQUOR ISSUED BY DOCTORS AND HONOURED BY GOVERNMENT LIQUOR VENDORS AND DRUGGISTS THROUGHOUT THE PROVINCE.

Vancouver Physicians.

Month.	Vancouver Vendor.	Vancouver Druggists.	Outside Vendors.	Outside Druggists.	Total.	No. of Doctors issuing Prescriptions.
January	7,820	2,716	13	60	10,609	164
February	7,544	2,449	13	12	10,018	165
March	9,577	6,049	2	33	15,661	191
April	5,938	5,196	25	40	11,199	185
May	6,965	9,381	33	77	16,456	178
June	5,264	2,569	10	12	7,855	156
July	7,739	3,308	22	33	11,102	161
August	9,793	4,654	40	27	14,514	164
September	11,124	5,425	29	42	16,620	183
October	13,522	6,259	33	52	19,866	187
November	13,542	6,599	52	45	20,238	203
December	17,814	9,127	134	136	27,211	210
Totals	116,642	63,732	406	569	181,349	...

Victoria Physicians.

Month.	Victoria Vendor.	Victoria Druggists.	Outside Vendors.	Outside Druggists.	Total.	No. of Doctors issuing Prescriptions.
January	1,904	491	4	3	2,402	47
February	2,075	414	10	4	2,503	45
March	2,272	546	7	..	2,825	43
April	1,829	522	11	..	2,362	46
May	2,158	469	9	18	2,654	51
June	2,066	444	17	9	2,536	46
July	2,597	493	34	9	3,133	50
August	3,057	522	22	13	3,614	53
September	3,729	661	35	20	4,445	59
October	4,861	717	45	12	5,635	61
November	4,938	657	51	37	5,683	67
December	7,089	734	99	18	7,940	68
Totals	38,575	6,670	344	143	54,732	...

Outside Physicians.

Month.	At Vendors.	At Druggists.	Total.	No. of Doctors issuing Prescriptions.
January	1,434	3,173	4,278	126
February	1,223	3,178	4,225	126
March	1,139	2,607	3,746	129
April	1,501	3,228	4,729	131
May	2,062	4,355	6,417	136
June	1,427	2,796	4,223	127
July	1,696	3,592	5,288	141
August	2,242	4,083	6,325	152
September	2,676	4,728	7,404	159
October	4,044	5,467	9,511	169
November	4,101	5,834	9,935	163
December	6,735	6,279	13,014	163
Totals	30,279	49,320	79,095	...

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

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MAR 19 1921

THIRD ANNUAL REPORT

OF

THE LAND SETTLEMENT BOARD

OF THE PROVINCE OF

BRITISH COLUMBIA

FOR THE YEAR ENDING

DECEMBER 31ST, 1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable Edward Gawler Prior,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

May it please Your Honour:

I have the honour to submit for your consideration herewith the Annual Report of the Land Settlement Board for the year 1919.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., March 19th, 1920.

LAND SETTLEMENT BOARD OF BRITISH COLUMBIA,

VICTORIA, B.C., March 17th, 1920.

The Honourable E. D. Barrow,

Minister of Agriculture, Victoria, B.C.

SIR,—I have the honour to transmit herewith the Third Annual Report of the Land Settlement Board for the year ending December 31st, 1919.

I have the honour to be,

Sir,

Your obedient servant,

W. S. LATTA,

Director.

Land Settlement Board of British Columbia.

Land Settlement.

During the year the Land Settlement Board has succeeded in establishing settlement areas in the vicinity of Prince George, Martin Lake, Alexandria, Rose Lake, Smithers, Francois Lake, Tatalaska Lake, Colleymount, and 10-Mile Lake respectively.

The benefits to be derived from the establishing of such areas are manifold. Many of the owners of land within such areas are now making a serious effort to develop their holdings in order to comply with the regulations of the Board. Others who find it inconvenient to utilize their lands are selling same to the Board at their appraised values, the Board in turn disposing of the lands so acquired to settlers who are in a position to utilize same.

The absentee owner or speculator is being forced into activity, and is now carrying on an energetic colonization campaign and disposing of his holdings to *bona-fide* settlers at reasonable prices in order to escape the conditions imposed by the "Land Settlement and Development Act" and the regulations of the Board.

An energetic educational campaign has been carried on with a view to interesting the settlers now on the land as to the best means of utilizing their farms.

Realizing that the Cariboo and Central British Columbia is specially adapted for dairying, and that the future success of the farmer in these districts will depend largely on the dairy cow, the Board has succeeded in interesting the farmers in this important industry, with the result that large numbers of them have, with the assistance of the Board, already procured the nucleus of dairy herds, and thus the foundation of an important industry has been laid.

Arrangements are now under way by which creameries will be established at different points, and the farmers are taking a lively interest in the construction of silos, several of which have already been built, with a view to economic feeding, the Board rendering assistance by distributing educational literature, furnishing plans, etc., and making arrangements whereby the material necessary for construction may be procured at reasonable prices.

Land Development.

Early in 1919 the attention of the Land Settlement Board was directed to the need for organized land-clearing to be undertaken in order to provide new areas for cultivation and production in the heavily timbered lands of Vancouver Island and Southern British Columbia.

It was recognized that adjacent to some of the best agricultural districts in the Province heavily timbered areas existed on which soil conditions were highly favourable to agricultural production, but that these were lying idle on account of the heavy initial work required to clear and make available such areas for cultivation.

Steps were taken to make a selection of typical areas with a view to undertaking land-clearing on a large scale. At the same time the need for measures to provide land for returned men who were desirous of taking up farming was so great as to compel immediate action along the lines indicated above.

Two main areas were selected, one comprising 14,000 acres of logged-over land in the Comox District, seven miles north of Courtenay; another in the Kootenay, near Creston, the latter containing 7,000 acres of land partially logged off.

Two smaller areas were acquired, one of 440 acres near Kelowna and one of approximately 1,000 acres near Fernie. These two, however, cannot be taken as typical areas for purposes of comparison.

In all areas a detailed survey was made and plans for the subdivision into farm units to suit local conditions were adopted.

The following are the average sizes of farm units in the various areas: Courtenay, 50 acres; Creston, 20 acres; Kelowna, 15 acres; Fernie, 80 acres.

It was decided as a general guide to development-work that the farms would be partially cleared, a proportionate acreage, varying from 5 to 20 acres, being fully cleared on each and a further similar acreage partially cleared for pasture. House-construction was undertaken in the two main areas.

The policy adopted by the Board with regard to the actual settlement of the areas was to employ in the development-work men who were desirous of obtaining farms ultimately. It was considered that the fitness of all such men for the work and management of a farm would be determined to a very great extent by their personal records in the development phase. This has been proved correct, and at the present time it is considered that, while development and cultivation of farms should be carried forward with all possible speed, the actual turning-over of such farms to individuals should be delayed until all possible steps have been taken to assure success.

Thus, while at Courtenay there are 200 acres that will be ready for crop in the coming season and at Creston approximately 100 acres in a similar state, it is considered desirable if possible to continue with the further development of the areas, using all available men for this purpose, while at the same time making full use of the land already available for cultivation.

Apart from the above plan, it will be advisable to allow a number of men who are well qualified to take up loans under the Soldier Settlement Board and to operate their own farms in the coming year. Arrangements are now complete with the Soldier Settlement Board to enable this to be done in a manner satisfactory to this Board.

Agricultural representatives are at work in both areas giving instruction to settlers and supervising cultivation of available land.

In addition to clearing operations, approximately 1,600 acres at Courtenay were seeded down last autumn for pasture. This area is being fenced and will provide adequate grazing for the community needs.

Owing to the increased cost of lumber, steps have been taken at Courtenay and Creston to secure a permanent supply at a cost uniform with that obtaining at the commencement of the work. At Creston a valuable timber limit is being acquired lying immediately adjacent to the area. A sawmill plant having a capacity of 20,000 feet per day will be installed.

It is considered that the manufactured lumber available by this means will be ample for all future requirements and that the requirements of the sawmill and logging-work will give additional employment to the settlers.

It is of interest to note that the land on which the timber referred to is located is of very good value for agricultural purposes and will be available ultimately for settlement.

In summarizing work completed in the development areas up to the end of the year, returns for land-clearing show that over 300 acres have been fully cleared, 350 acres blasted ready for grubbing, and 700 additional acres rough-cleared; 1,600 acres have been seeded down for common pasturage. Eighty temporary and thirty-five permanent houses have been erected.

Over 300 returned soldiers have received constant employment at wages ranging from $4 per day upwards. Of the above, 100 married men with families have been accommodated in the areas, and schools at Creston and Courtenay have been erected to accommodate over 120 children who are of school age.

Stores are operated at Courtenay and Creston to supply the needs of the settlers, all profits being divided amongst the people in the settlements in proportion to the amount of purchases.

A community centre has been laid out at Courtenay, with provision also for a number of small tracts of land for workmen.

AGRICULTURAL LOANS.

The lending of money on agricultural lands during the past season's operations has been of very material benefit to the farmers of British Columbia in enabling them to increase agricultural production by the purchase of stock, implements, machinery, etc., and to clear and bring under cultivation more land. The fact that only a very small percentage of the borrowers are in arrears and that no foreclosures were necessary points to a very healthy state of affairs in this branch of the Board's work.

DYKING COMMISSIONERS.

The Board has also acted during 1919 as Dyking and Drainage Commissioners for the Sumas Dyking District, West Nicomen Dyking District, and Cameron Drainage District.

AGRICULTURAL CREDIT COMMISSION.

REPORT OF LOAN APPLICATIONS FOR THE YEAR ENDING DECEMBER 31ST, 1919.

On Hand at January 1st, 1919.

11 appraised			$25,250 00
Disposed of as follows:—	Applied for.	Granted.	
1 granted	$ 6,000 00	$6,000 00	
2 rejected	6,000 00		
8 pending	13,250 00		
	$25,250 00		
26 unappraised			$22,150 00
Disposed of as follows:—			
7 withdrawn		$ 7,950 00	
19 awaiting appraisal		14,200 00	
		$22,150 00	

REPORT OF APPLICATIONS DURING 1919.

11 appraised (as at January 1st, 1919)			$25,250 00
Disposed of as follows:—	Applied for.	Granted.	
1 granted	$ 6,000 00	$6,000 00	
2 rejected	6,000 00		
8 pending	13,250 00		
	$25,250 00		

Eight Applications pending Action as at January 1st, 1919.

Application No.	Amount.	Remarks.
36	$ 500 00	Dominion homestead.
79	850 00	Enemy alien.
193	3,000 00	„
270	500 00	„
539	1,000 00	„
725	4,400 00	„
757	2,000 00	„
1233	1,000 00	„
8	$13,250 00	

26 unappraised		$22,150 00
Disposed of as follows:—		
7 withdrawn	$ 7,950 00	
19 awaiting appraisal	14,200 00	
	$22,150 00	

Nineteen Applications awaiting Appraisal as at January 1st, 1919.

Application No.	Amount.	Remarks.	Fees.
600	$ 1,000 00	Dominion homestead	$ 5 00
631	1,000 00	„ „	5 00
749	500 00	„ „	2 50
755	350 00	„ „	2 50
827	500 00	In appraiser's hands	2 50
864	600 00	Dominion homestead	5 00
974	500 00	„ „	2 50
1019	500 00	„ „	2 50
1024	1,000 00	„ „	5 00
1154	250 00	„ „	2 50
1180	1,000 00	„ „	5 00
1194	500 00	„ „	2 50
1202	2,000 00	„ „	7 50
1358	500 00	„ „	2 50
1377	500 00	„ „	5 00
1385	500 00	„ „	2 50
1401	1,000 00	„ „	7 00
597	1,500 00	„ „	7 50
1355	500 00	„ „	2 50
19	$14,200 00		$77 00

STATUS OF AGRICULTURAL CREDIT COMMISSION LOANS AS AT DECEMBER 31ST, 1919.

382 loans in force as at end of 1918 for		$773,350 00
1 loan cancelled during 1919	$ 750 00	
40 loans have been paid off during 1919	79,350 00	
41 loans disposed of as at December 31st, 1919	$ 80,100 00	
382 loans in force	$773,350 00	
41 loans disposed of	80,100 00	
341 loans in force as at January 1st, 1920, for	$693,250 00	
4 loans granted, principal not yet paid	$ 4,300 00	
Amount still due to borrowers		$ 4,238 00
Balance of loans as at December 31st, 1919—		
Principal	$639,086 58	
Interest	6,495 62	
		645,582 20

ACCRUED INTEREST ON VICTORY LOAN BONDS.

Amount.	Due Date.	No. of Days.	Rate.	Interest.
			Per Cent.	
$ 53,250 00	December 1st	31	5½	$ 248 74
110,150 00	November 1st	61	5½	1,012 48
$163,400 00				$1,261 22
	Less amount now credited			379 72
				$ 881 50

REVENUE AND EXPENDITURE ACCOUNTS FOR YEAR ENDING DECEMBER 31ST, 1919.

A.C.C. Accounts.

Expenditure.		Revenue.	
Proportion expenses, L.S.B.	$ 7,857 65	Interest on deposits	$ 1,314 93
Postage and stationery	157 85	Interest on loans	46,964 05
Depreciation, furniture and equipment (10 per cent. written off)	54 60	Interest on Sinking Funds	5,249 79
Appraisers' expenses	32 75	Appraisal fees	15 00
Legal expenses, trustee fees	200 00	Legal fees	79 26
Interest on debentures	45,000 00	Balance, being deficit for year carried to balance-sheet	7,744 93
Interest rebates	240 95		
Interest on deferred payments, Victory Loan bonds	116 00		
Exchange and discount	13 96		
U.S. premium on coupons	1,582 20		
Discount on debentures, 1/25 written off	6,112 00		
	$61,367 96		$61,367 96

STATEMENT OF ASSETS AND LIABILITIES AS AT DECEMBER 31ST, 1919.

A.C.C. Accounts.

Assets.			Liabilities.	
Cash in bank—			Debentures, due May 1st, 1941	$1,000,000 00
Canadian Bank of Commerce—			Appraisal fees (unearned)	77 00
Current Account	$ 26,975 77		Coupons unpaid	1,327 50
Coupon Account	1,327 50		Accrued interest on debentures	7,500 00
Discount on debenture sales	130,389 34		Accounts payable	25,829 57
Furniture and equipment	500 00			36 11
Loans on security of first mortgage	639,086 58			
Interest outstanding on loans	6,495 62			
Accrued interest on loans	10,305 63			
Sinking Funds	164,683 00			
Victory Loan bonds	$163,400 00			
Canadian Bank of Commerce	21 78			
Accrued interest on Victory Loan bonds	1,261 22			
Balance—				
Deficit as at Dec. 31st, 1918	$ 47,261 81			
Deficit for year ended December 31st, 1919	7,744 93			
		55,006 74		
		$1,034,770 18		$1,034,770 18

Deficit, 1916	$19,015 32
„ 1917	22,200 92
„ 1918	6,045 57
„ 1919	7,744 93
Total deficit	$55,006 74

LAND SETTLEMENT BOARD.

REPORT OF LOAN APPLICATIONS FOR THE YEAR ENDING DECEMBER 31ST, 1919.

1918 Applications.

9 appraised		$ 16,100 00
Disposed of as follows:—	Applied for.	Granted.
1 granted	$ 2,000 00	$1,400 00
2 rejected	6,500 00	
6 pending	7,600 00	
	$16,100 00	

24 unappraised			$ 34,850 00
Disposed of as follows:—			
7 granted	$12,250 00	$11,150 00	
11 rejected	12,900 00		
6 awaiting appraisal	9,700 00		
	$34,850 00		

1919 Applications.

180 applications			$452,650 00
Disposed of as follows:—			
85 granted	$178,250 00	$151,650 00	
62 rejected	207,800 00		
33 awaiting action	66,600 00		
180	$452,650 00		

STATUS OF LAND SETTLEMENT BOARD LOANS AS AT DECEMBER 31ST, 1919.

217 loans in force as at end of 1918 for			$468,850 00
100 loans granted during 1919 for			183,700 00
317 loans granted for			$652,550 00
19 loans cancelled during 1919 for		$30,650 00	
21 loans have been paid off		37,700 00	
40 loans have been disposed of for			68,350 00
277 loans in force			$584,200 00
36 loans granted, principal not yet paid		$88,100 00	
Amount still due to borrowers			86,487 49
Balance of loans as at December 31st, 1919—			
Principal		$472,885 76	
Interest		3,755 30	
			476,641 06

STATEMENT OF ASSETS AND LIABILITIES AS AT DECEMBER 31ST, 1919.

Assets.

Cash and advances—			
Cash in hand		$ 604 51	
Cash in bank		260 73	
Advances to Directors and sub-offices for expenses		1,200 00	
			$ 2,065 24
Loans—			
Loans granted		$621,900 00	
Less amounts due to borrowers		145,258 94	
			476,641 06
Accrued interest—			
On loans		$ 7,496 88	
On live-stock sales		506 74	
On land-sales		1,327 68	
			9,331 30
Accounts receivable—			
Live-stock sales		$ 40,028 17	
Agricultural Credit Commission		24,603 86	
Sundry accounts		299 95	
			64,931 98
Carried forward			$ 552,969 58

Brought forward			$ 552,969 58
Land purchases and development—			
Area.	Purchase Price.	Development Costs.	
Courtenay	$ 64,898 86	$255,059 69	
Creston	82,834 85	115,657 61	
Kelowna	33,070 50	17,900 21	
Fernie	12 50	20,055 22	
Telkwa	27,668 35	2,022 10	
Vanderhoof	64,690 66	4,720 84	
Marten Lake	4,067 32	1,251 56	
Prince George	42,117 29	1,176 42	
Lot 341, R. 5, C.D.	3,215 35	.....	
Cranbrook	4,741 99	539 90	
Smithers	.....	917 24	
Rose Lake	.....	750 20	
6-Mile Lake	.....	274 60	
Alexandria	.....	490 60	
Francois Lake	.....	1,931 49	
	$327,317 67	$422,807 68	
		327,317 67	
			750,125 35
Investigations—			
10-Mile Lake (lands)		$ 422 81	
Barrett Ranch (lands)		1,360 64	
Sayward District (lands)		235 40	
Pritchard (lands)		777 89	
Beaver Valley (lands)		308 90	
Elk Creek (drainage)		60 80	
			3,166 44
Dyking and drainage projects—			
Capital Account—			
Cameron drainage		$ 6,570 63	
Sumas Dyke		26,216 94	
Cherry Creek		1,490 85	
Maintenance Account—			
West Nicomen Dyke		3,317 68	
			37,596 10
Office furniture and equipment (less depreciation)			2,355 00
Office alterations			700 00
Motor-car (less depreciation)			600 00
Stationery			400 00
Balance—			
Deficit as at December 31st, 1918		$ 16,731 67	
Deficit for year ending December 31st, 1919		51,856 52	
			68,588 19
			$1,416,500 66

Liabilities.

Loans—			
Provincial Treasury			$1,315,897 92
Accounts payable—			
Sundry		$ 1,971 38	
Development areas		57,277 55	
			59,248 93
Carried forward			$1,375,146 85

Brought forward		$1,375,146 85
Land-sales receipts—		
Part Lot 341, R. 5, C.D.	$ 550 00	
Telkwa Area	16,094 81	
Vanderhoof Area	22,948 66	
Courtenay Area	64 24	
Marten Lake Area	1,447 60	
		41,105 31
Appraisal fees unearned		248 50
		$1,416,500 66

STATEMENT OF REVENUE AND EXPENDITURE FOR YEAR ENDING DECEMBER 31ST, 1919.

Expenditure.			Revenue.		
Salaries—			Appraisal fees		$ 885 00
Directors	$ 7,987 25		Exchange, discount, and commission		24 81
Office staff	13,118 14		Legal fees		725 20
		$21,105 39	Interest—		
Travelling expenses—			On loans	$33,445 72	
Directors	$ 7,759 10		*Less* rebates	1,321 54	
Office staff	296 14			$32,124 18	
		8,055 24	Live-stock sales	1,527 56	
Office expenses—			Bank deposits	260 73	
Stationery	$ 690 28		Land-sales	1,549 60	
Postage	375 00		Dyking and drainage projects	1,202 75	
Telegrams and telephone	160 00				36,664 82
		1,225 28	Agricultural Credit Commission, proportion of operating expenses		7,857 65
Sub-offices—			Balance, being deficit for year, carried to balance-sheet		51,856 52
Vancouver (salaries and expenses)	$ 1,654 47				
Kelowna (expenses)	84 60				
Cranbrook (expenses)	210 55				
		1,949 62			
Interest on Treasury loans		47,772 72			
Rebates on returned soldiers' land purchases		14,919 10			
Publicity, pamphlets, etc.		544 75			
Expenses *re* live-stock purchases		356 19			
Depreciation—					
Furniture and equipment	$270 29				
Alterations	542 81				
		813 10			
Costs of investigations written off—					
Palling lands	$194 70				
Rippon lands	67 68				
Leistikow lands	141 60				
Kitwanga lands	28 00				
Fort St. James lands	32 75				
Burns Lake lands	56 95				
Gold Creek lands	13 00				
Nazko River lands	33 50				
General lands	80 00				
"Empress of Asia" scheme	178 00				
		826 18			
Directors' removal expenses		446 43			
		$98,014 00			$98,014 00

I hereby certify that the accompanying balance-sheets and revenue and expenditure statements are in agreement with the books of the Land Settlement Board (including the separate books of the Agricultural Credit Commission), and exhibit a true and fair statement of the financial position of the Board as at December 31st, 1919, and the result of the operations for the year ended that date.

A. N. MOUAT, C.A.,
Comptroller-General.

Victoria, B.C., March 11th, 1920.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

PRINTING OFFICE REPORT, 1918-1919.

To Colonel the Honourable Edward Gawler Prior,
A Member of the King's Privy Council for Canada,
Lieutenant-Governor of the Province of British Columbia.

May it please Your Honour:

In accordance with section 14 of the "Statutes and Journals Act," I have the honour to present the following Report.

I have the honour to be,
Sir,
Your obedient servant,

J. D. MacLEAN,
Provincial Secretary.

PRINTING OFFICE REPORT.

RETURN showing the Number of Copies of the Statutes, Journals, and Sessional Papers which have been bound, and disposed of during the Twelve Months ending March 31st, 1919, and the Number remaining on hand at that Date, together with a Statement of the Work performed in the Printing Office, for the various Departments, and the Expenses incurred by the Department during that Period, in accordance with the "Statutes and Journals Act."

Year.	Statutes.				Journals.				Sessional Papers.				Work Performed.				No. of Impressions Printed.	Expenses of Department.			Revenue Received.
	On hand April 1st, 1918.	Bound.	Sold.	Remaining on hand March 31st, 1919.	On hand April 1st, 1918.	Bound.	Sold.	Remaining on hand March 31st, 1919.	On hand April 1st, 1918.	Bound.	Sold.	Remaining on hand March 31st, 1919.	No. of Jobs.	No. of Pages. Plain.	No. of Pages. Tabular.	Total No. of Pages		Salaries.	Printing Material, Paper, etc.	Total.	
1872	....	....	....	....	13	....	....	13	....	....	....	....									
1875	3	....	....	3	....	....	....	....	....	....	....	....									
1876	13	....	....	13	19	....	....	19	....	....	....	....									
1878	....	....	....	....	9	....	....	9	....	....	....	....									
1880	....	....	....	....	8	....	....	8	....	....	....	....									
1886	15	....	....	15	....	....	....	....	....	....	....	....									
1887	35	....	....	35	....	....	....	....	....	....	....	....									
1888	25	....	....	25	6	....	....	6	....	....	....	....									
C.A. 1888	1	....	....	1	....	....	....	....	....	....	....	....									
1889	1	....	....	1	....	....	....	....	....	....	....	....									
1890	1	....	1	....	13	....	....	13	....	....	....	....									
1891	1	....	....	1	10	....	9	1	....	....	....	....									
1892	....	....	....	....	10	....	10	....	....	....	....	....									
1893	1	....	....	1	17	....	17	....	....	....	....	....									
1894	....	....	....	....	8	....	8	....	....	....	....	....									
1895	1	....	....	1	23	....	18	5	....	....	....	....									
1896	....	....	....	....	32	....	5	27	....	....	....	....									
1897	....	....	....	....	32	....	....	32	....	....	....	....									
R.S. 1897	....	....	....	....	....	....	....	....	....	....	....	....									
1898	....	....	....	....	11	....	....	11	....	....	....	....									
1899	....	....	....	....	12	....	....	12	....	....	....	....									
1901	1	....	....	1	....	....	....	....	36	....	18	18									
1902	....	....	....	....	36	....	10	26	....	....	....	....									
1903	....	....	....	....	....	....	....	....	....	....	....	....									
1903-4	....	....	....	....	12	....	....	12	1	....	1	....									
1905	....	....	....	....	13	....	....	13	25	....	18	7									
1906	....	....	....	....	41	....	....	41	34	....	....	34									
1907	131	....	....	131	20	....	....	20	....	....	....	....									
1908	63	....	....	63	58	....	56	2	23	....	21	2									
1909	75	....	....	75	42	....	1	41	33	....	....	33									
1910	132	....	....	132	59	....	....	59	....	....	....	....									
1911	53	....	....	53	155	....	....	155	....	....	....	....									
R.S. 1911	4	67	46	25	....	....	....	....	....	....	....	....									
R.S. Vol. 4	13	12	4	21	....	....	....	....	....	....	....	....									
1912	280	....	46	234	240	....	....	240	82	....	....	82									
1913	318	164	49	433	180	....	....	180	26	....	24	2									
1914	110	59	51	118	207	....	....	207	9	....	....	9									
1915	121	50	58	113	63	....	....	63	16	....	....	16									
1916	28	100	69	59	162	....	1	161	6	....	....	6									
1917	80	204	84	200	62	....	....	62	15	....	....	15									
1918	....	500	393	107	....	225	....	25	....	200	177	23	3,414	18,867	2,091	20,958	7,063,210	$84,908 82	$59,619 00	$144,527 82	$170,561 21

STATEMENT of the Number of Statutes sold during the Twelve Months ending March 31st, 1919; also showing the Amount of Revenue received and paid into the Treasury for the same Period.

Particulars.	No. of Copies sold.	Amount received.
Statutes, 1912	46	$ 98 50
„ 1913	49	106 00
„ 1914	51	110 50
„ 1915	58	128 00
„ 1916	69	153 50
„ 1917	84	192 50
„ 1918	393	898 75
Revised Statutes, 1911	46	761 00
„ „ „ Vol. 4	4	19 00
Sale of other documents and advertising in B.C. Gazette	..	168,093 46
Total revenue received	..	$170,561 21

SUMMARY OF EXPENDITURE, 1918-19.

(April 1st, 1918, to March 31st, 1919.)

Salaries	$ 84,908 82
Expenses—	
Office supplies	1,558 44
Printing paper, material, etc.	31,378 63
New machinery	187 00
Stationery	26,494 93
	$144,527 82

PRINTING AND STATIONERY SUPPLIED TO VARIOUS DEPARTMENTS FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1919.

Vote No.	Service.	Amount.	Total.
2	Legislation	$ 12,434 94	$ 12,434 94
3	Premier's Office	266 76	266 76
	Department of Agriculture—		
4	Minister's Office	75 85	
5	General Office	4,018 40	
6	Horticultural Branch	1,000 31	
7	Live Stock Branch	1,076 99	
8	Miscellaneous Grants, etc.—		
	Farmers' Institutes	767 90	
	Women's Institutes	390 55	
	B.C. Stock-breeders	10 20	
	B.C. Seed-growers	15 00	
	Collection of Agricultural Statistics	270 73	
	Departmental Exhibits	10 80	
S.W. No. 8		32 30	
Chap. 75, 1918	"Seed-growers Act"	9 80	
			7,678 83
	Department of the Attorney-General—		
9	Attorney-General's Office	$ 198 87	
10	General Office	1,149 40	
11	Joint-stock Companies and Insurance Branch	1,459 00	
12	Municipal Branch	376 66	
13	Censor of Moving Pictures	260 73	
14	Commissioner's Office	582 96	
	Vancouver Vendor	443 18	
	Victoria Vendor	30 25	
	Miscellaneous	223 97	
15	Provincial Library and Archives	2,672 54	
	Travelling Libraries	135 00	
	Land Registry Offices—		
16	Kamloops	634 11	
17	Nelson	345 09	
18	New Westminster	521 08	
19	Prince Rupert	102 96	
20	Vancouver	1,045 86	
21	Victoria	872 40	
	Supreme and County Courts—		
22	Chilliwack	11 98	
23	Ladysmith	11 46	
24	Merritt	1 00	
25	Nelson	86 25	
26	New Westminster	230 44	
27	Prince Rupert	44 88	
28	Vancouver	907 31	
29	Victoria	629 19	
	Provincial Police—		
31	Headquarters	783 84	
	Divisions	2,749 50	
	County Gaols—		
32	Kamloops	36 25	
33	Nelson	46 65	
34	Oakalla Prison Farm	223 21	
	Industrial Schools—		
35	Boys' School	144 42	
36	Girls' School	146 22	
43	Constitutional Litigation and Law Costs	6 50	
45	Game-protection, etc.	884 81	
51	Incidentals and Contingencies	980 03	
Chap. 79, 1918	"Sheriffs Act" (Vancouver)	164 22	
„ 92, 1918	Uniformity of Law, etc.	273 05	
			19,355 27
	Department of Education—		
52	General Office	$ 4,516 51	
53	Free Text-book Branch	1,266 54	
54	Agricultural Education	264 80	
55	Industrial Education	195 84	
56	Inspection of Schools	88 83	
57	Normal School, Vancouver	87 78	
58	„ Victoria	97 05	
67	Erection of New Buildings, etc.	313 50	
68	Examination of Teachers	709 10	
69	„ *re* High School Entrance	417 55	
71	Contingencies	6 65	
			7,964 15
	Department of Finance—		
72	Minister's Office	$ 113 10	
73	General Office	1,373 43	
74	Inspector of Trust Companies, etc.	418 20	
75	Controlling and Audit Branch	1,579 82	
76	Surveyor of Taxes	3,173 01	
77	Bureau of Information	434 40	
78	Agent-General's Office, London	200 09	
	Government Agents and Assessors, etc.—		
79	Alberni Agency	145 90	
80	Anyox Agency	78 21	
	Carried forward	$ 7,516 16	$ 47,699 95

PRINTING AND STATIONERY SUPPLIED TO VARIOUS DEPARTMENTS FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1919—*Continued.*

Vote No.	Service.	Amount.	Total.
	Brought forward	$ 7,516 16	$ 47,699 95
	Department of Finance—*Continued.*		
	Government Agents and Assessors, etc.—*Continued.*		
81	Ashcroft Agency	95 65	
82	Atlin Agency	107 27	
83	Barkerville Sub-agency	67 49	
84	Clinton Agency	161 47	
85	Cranbrook Agency	346 50	
86	Cumberland Agency	107 28	
87	Duncan Agency	143 54	
88	Fairview Agency	80 32	
89	Fernie Agency	144 76	
90	Fort Fraser Agency	127 36	
91	Fort George Agency	446 57	
92	Golden Agency	231 98	
93	Grand Forks Agency	46 61	
94	Greenwood Agency	125 30	
95	Hazelton Agency (transferred to Smithers)	404 90	
96	Kamloops Agency	368 84	
97	Kaslo Agency	265 01	
98	Lillooet Sub-agency	118 86	
99	Nanaimo Agency	303 70	
100	Nelson Agency	406 65	
101	New Westminster Agency	449 48	
102	New Denver Sub-agency	29 13	
103	Nicola Agency (transferred to Merritt)	120 15	
104	150-Mile House	106 38	
105	Prince Rupert Agency	597 03	
106	Princeton Agency	193 53	
107	Quesnel Agency	524 37	
108	Queen Charlotte Islands Sub-agency	48 46	
109	Revelstoke Agency	496 92	
110	Rossland Agency	427 18	
111	Telegraph Creek Agency	73 86	
112	Trout Lake Sub-agency	32 69	
113	Vancouver Agency	1,295 93	
114	Vernon Agency	228 64	
115	Victoria Assessor	494 23	
116	Wilmer Sub-agency	37 24	
117	Yale Sub-agency	207 57	
118	Sundry Sub-agencies	212 18	
	Miscellaneous—		
119	Printing Public Accounts	3,573 80	
122	"Amusements Tax Act" (expenses)	15 25	
124	Miscellaneous, not detailed in Estimates	16,181 88	
			36,962 12
125	Department of Fisheries	$ 885 10	885 10
	Department of Lands—		
126	Minister's Office	$ 93 05	
133	General Office and Branches	15,950 18	
134	Forest Protection Fund	367 30	
Chap. 80, 1918	"Soldiers' Land Act"	89 30	
142	Land Surveys	22 95	
144	General Investigations	26 46	
			16,549 24
	Department of Labour—		
146	Expenses (office supplies)	$ 1,536 47	
Chap. 56, 1918	Minimum Wage	220 00	
S.W. No. 45..	Employment Bureau	470 58	
			2,227 05
	Department of Mines—		
147	Minister's Office	$ 150 78	
148	General Office	5,519 83	
149	Mines Inspection Branch	519 53	
150	Bureau of Mines	458 08	
151	Mine-rescue and Training Stations	96 84	
152	Coal-miners' Examinations	173 02	
156	"Mineral Survey and Development Act" (supplementary)	557 69	
Chap. 41, 1917	"Mineral Survey and Development Act, 1917"	86 89	
	" " " " "	32 50	
			7,595 16
	Department of the Provincial Secretary—		
157	Minister's Office	$ 342 48	
158	General Office	2,349 21	
159	Provincial Board of Health	5,717 30	
160	Provincial Museum	376 15	
	Mental Hospitals—		
161	New Westminster	432 89	
162	Essondale	333 39	
163	Colony Farm and Nursery	40 20	
164	Provincial Home, Kamloops	94 30	
	Carried forward	$ 9,685 92	$111,918 62

PRINTING AND STATIONERY SUPPLIED TO VARIOUS DEPARTMENTS FOR THE TWELVE MONTHS ENDING MARCH 31ST, 1919—*Continued.*

Vote No.	Service.	Amount.	Total.
	Brought forward	$ 9,685 92	$111,918 62
	Department of Provincial Secretary—*Continued.*		
171	Registration of Voters	423 31	
172	Royal Commissions	523 94	
182	Grant for Patriotic Purposes—		
	Canadian Patriotic Fund	298 90	
	Returned Soldiers' Commission	824 58	
183	"Civil Service Act"	981 31	
185	Contingencies	32 20	
175A	Supplementary (B.C. University)	3,078 92	
S.W.	Elections	855 35	
			16,704 43
	Department of Public Works—		
186	Minister's Office	$ 123 15	
187	General Office	1,779 79	
188	District Engineers	860 12	
189	Steam-boiler Inspection	724 00	
190	"Electrical Energy Inspection Act"	32 52	
191	"Factories Act"	91 39	
192	Maintenance of Government House and Grounds (miscellaneous)	113 05	
193	Maintenance of Parliament Buildings and Grounds	124 45	
194	Roads, Streets, Bridges, and Wharves	3,753 55	
195	Steamboats, Ferries, and Bridges	39 45	
S.W.	Ferries (South Fort George and Soda Creek)	8 00	
			7,649 47
	Department of Railways—		
196	General Office	$ 530 12	
197	Fraser River Bridge, New Westminster	12 61	
			542 73
206	Cowichan Bay Float	$ 10 00	
207, S.W.	Fort George	8 00	
			18 00
			$136,833 25

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

ANNUAL REPORT

OF THE

MINISTER OF MINES

FOR THE

YEAR ENDING 31ST DECEMBER

1919

BEING AN ACCOUNT OF

MINING OPERATIONS FOR GOLD, COAL, ETC.

IN THE

PROVINCE OF BRITISH COLUMBIA

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The Annual Report of the Provincial Mineralogist upon the Mining Industry of the Province for the year 1919 is herewith respectfully submitted.

WILLIAM SLOAN,

Minister of Mines.

Minister of Mines' Office,

March 24th, 1920.

Rock Candy Mine (Fluorspar) Mill, near Grand Forks.

LIBRARY
OF THE
UNIVERSITY OF ILLINOIS

To the Honourable William Sloan,
Minister of Mines.

Sir,—I have the honour to submit herewith my Annual Report on the Mining Industry of the Province for the year ending December 31st, 1919.

The statistical tables give the total mineral output of the Province to date, and show in considerable detail the actual mineral production of the past year, as based on smelter or mill returns; also, a summary of the production of each of the last four years, thus illustrating by comparison the progress made in productive mining during this period.

To facilitate comparison with information previously given, I have retained, as closely as was possible, the general form already established for such tables and for the Report.

I have the honour to be,
Sir,
Your obedient servant,
WILLIAM FLEET ROBERTSON,
Provincial Mineralogist.

Bureau of Mines, Victoria, B.C.,
March 24th, 1920.

MINERAL PRODUCTION OF BRITISH COLUMBIA.

METHOD OF COMPUTING PRODUCTION.

In assembling the output of the lode mines in the following tables, the established custom of this Bureau has been adhered to, viz.: The output of a mine for the year is considered that amount of ore for which the smelter or mill returns have been received during the year. This system does not give the exact amount mined during the year, but rather the amount credited to the mine on the company's books during such year.

For ore shipped in December the smelter returns are not likely to be received until February in the new year, or later, and have, consequently, to be carried over to the credit of such new year. This plan, however, will be found very approximate for each year, and ultimately correct, as ore not credited in one year is credited in the next.

In the lode mines tables, the amount of the shipments has been obtained from certified returns received from the various mines, as provided for in the "Inspection of Metalliferous Mines Act, 1897." In calculating the value of the products, the average prices for the year in the New York Metal Market have been used as a basis. For silver 95 per cent., for lead 90 per cent., and for zinc 85 per cent. of such market prices have been taken. Treatment and other charges have not been deducted, except that in copper the amount of metal actually recovered has been taken, thus covering loss in slags.

TABLE I.—Total Production for all Years up to and including 1919.

Gold, placer	$ 75,722,603
Gold, lode	100,272,431
Silver	50,432,304
Lead	43,821,106
Copper	153,680,965
Zinc	16,818,487
Coal and coke	199,123,323
Building-stone, bricks, etc.	29,991,757
Miscellaneous minerals, etc	786,918
Total	$670,649,894

TABLE II.—Production for each Year from 1852 to 1919 (inclusive).

1852 to 1892 (inclusive)	$ 81,090,069
1893	3,588,413
1894	4,225,717
1895	5,643,042
1896	7,507,956
1897	10,455,268
1898	10,906,861
1899	12,393,131
1900	16,344,751
1901	20,086,780
1902	17,486,550
1903	17,495,954
1904	18,977,359
1905	22,461,325
1906	24,980,546
1907	25,882,560
1908	23,851,277
1909	24,443,025
1910	26,377,066
1911	23,499,072
1912	32,440,800
1913	30,296,398
1914	26,388,825
1915	29,447,508
1916	42,290,462
1917	37,010,392
1918	41,782,474
1919	33,296,313
Total	$670,649,894

Table III. gives a statement in detail of the quantities and value of the different mineral products for the years 1917, 1918, and 1919. It is difficult to get absolutely complete statistics regarding building-stone, lime, bricks, tiles, and other miscellaneous products, but the detail figures shown in Table V. are as nearly accurate as can be obtained.

TABLE III.

QUANTITIES AND VALUE OF MINERAL PRODUCTS FOR 1917, 1918, AND 1919.

	Customary Measure.	1917.		1918.		1919.	
		Quantity.	Value.	Quantity.	Value.	Quantity.	Value.
Gold placer	Ounces.	24,800	$ 496,000	16,000	$ 320,000	14,325	$ 286,500
" lode	"	114,523	2,367,190	164,674	3,403,812	152,426	3,150,645
Silver	"	2,929,216	2,265,749	3,498,172	3,215,870	3,403,119	3,592,673
Lead	Pounds	37,307,465	2,951,020	43,899,661	2,928,107	29,475,968	1,526,855
Copper	"	59,007,565	16,038,256	61,483,754	15,143,449	42,459,339	7,939,896
Zinc	"	41,848,513	3,166,259	41,772,916	2,899,040	56,737,651	3,540,429
Coal	Tons, 2,240 lb.	2,149,975	7,524,913	2,302,245	11,511,225	2,267,541	11,337,705
Coke	" "	159,905	959,430	188,967	1,322,769	91,138	637,966
Miscellaneous products			1,241,575		1,038,202		1,283,644
			$37,010,392		$41,782,474		$33,296,313

TABLE IV.

OUTPUT OF MINERAL PRODUCTS BY DISTRICTS AND DIVISIONS.

NAMES.	DIVISIONS.			DISTRICTS.		
	1917.	1918.	1919.	1917.	1918.	1919.
CARIBOO DISTRICT				$ 529,897	$ 383,996	$ 196,801
Cariboo and Quesnel Mining Division	$ 152,756	$ 83,500	$ 73,500			
Omineca Mining Division	377,141	300,496	123,301			
CASSIAR DISTRICT				8,485,438	9,178,441	6,402,082
EAST KOOTENAY DISTRICT				5,056,782	7,259,897	6,612,954
WEST KOOTENAY DISTRICT				5,972,545	6,113,279	4,669,090
Ainsworth Division	750,514	663,388	405,478			
Slocan and Slocan City "	3,554,055	3,675,762	2,900,087			
Nelson "	403,436	396,697	76,719			
Trail Creek "	1,197,283	1,357,571	1,275,538			
Other parts	67,257	19,861	11,268			
BOUNDARY-YALE DISTRICT				5,055,403	4,961,452	2,527,514
Osoyoos, Grand Forks, and Greenwood Divisions	4,253,965	3,897,826	1,637,827			
Similkameen, Nicola, Vernon	571,300	909,869	759,637			
Yale, Ashcroft, Kamloops	230,138	153,757	130,050			
LILLOOET DISTRICT				73,175	57,746	62,684
COAST DISTRICT (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria, Vancouver)				11,837,152	13,827,663	12,825,188
				$37,010,392	$41,782,474	$33,296,313

TABLE V.

Miscellaneous Products and Totals of Production, 1919.

District and Division.	Cement.	Lime and Limestone.	Building-stone.	Riprap.	Crushed Rock, Flux.	Sand and Gravel.	Pottery and Clay.	Fire, Face, and Red Brick.	Total Building Materials.	Miscellaneous Minerals.	Total Miscellaneous Products.	Total Output of Collieries.	Total of Metalliferous Minerals.	Totals for Divisions.	Totals for Districts.
	$	$	$	$	$	$	$	$	$	$	$	$	$	$	$
Cariboo															196,801
Cariboo and Quesnel		500		3,000					3,500		3,500		70,000	73,500	
Omineca		500							500		500	8,760	114,041	123,301	
Cassiar															6,402,082
Atlin, Stikine-Liard													177,000	177,000	
Skeena, Nass River, Portland Canal, Queen Charlotte				4,000	167,695				171,695	6,000	177,695		6,047,387	6,225,082	
East Kootenay															6,612,954
Fort Steele		1,500							1,500	15,300	16,800	2,764,824	3,672,881	6,454,505	
Windermere-Golden													158,449	158,449	
West Kootenay															4,669,090
Ainsworth										1,230	1,230		404,248	405,478	
Slocan & Slocan City													2,900,087	2,900,087	
Nelson & Arrow Lake		1,500		1,000		600		1,000	4,100		4,100		72,619	76,719	
Trail Creek													1,275,538	1,275,538	
Other Divisions						4,661			4,661		4,661		6,607	11,268	
Boundary-Yale															2,527,514
Grand Forks, Greenwood, Osoyoos		13,048		1,000					14,048	93,779	107,827		1,530,000	1,637,827	
Similkameen, Nicola, Vernon		2,000		1,000					3,000	1,500	4,500	745,210	9,927	759,637	
Yale, Ashcroft, Kamloops		1,000		1,000				1,652	3,652	3,600	7,252		122,798	130,050	
Lillooet										3,000	3,000		59,684	62,684	62,684
Coast District	260,000	184,490	15,750	21,240	76,102	62,345	97,777	224,125	941,829	10,750	952,579	8,456,877	3,415,732	12,825,188	12,825,188
Totals	269,000	204,538	15,750	32,240	243,797	67,606	97,777	226,777	1,148,485	135,159	1,283,644	11,975,671	20,036,998	33,296,313	33,296,313

TABLE VI.—PLACER GOLD.

Table VI. contains the yearly production of placer gold to date, as determined by the returns sent in by the banks and express companies, of gold transmitted by them to the mints, and from returns sent in by the Gold Commissioners and mining Recorders. To these yearly amounts one-third was added up to the year 1878; from then to 1895 and from 1898 to 1909, one-fifth; and since then one-tenth, which proportions are considered to represent, approximately, the amount of gold sold of which there is no record. This placer gold contains from 10 to 25 per cent. silver, but the silver value has not been separated from the totals, as it would be insignificant.

YIELD OF PLACER GOLD TO DATE.

1858	$ 705,000	1874	$1,844,618	1890	$ 490,435	1905	$969,300
1859	1,615,070	1875	2,474,004	1891	429,811	1906	948,400
1860	2,228,543	1876	1,786,648	1892	399,526	1907	828,000
1861	2,666,118	1877	1,608,182	1893	356,131	1908	647,000
1862	2,656,903	1878	1,275,204	1894	405,516	1909	477,000
1863	3,913,563	1879	1,290,058	1895	481,683	1910	540,000
1864	3,735,850	1880	1,013,827	1896	544,026	1911	426,000
1865	3,491,205	1881	1,046,737	1897	513,520	1912	555,500
1866	2,662,106	1882	954,085	1898	643,346	1913	510,000
1867	2,480,868	1883	794,252	1899	1,344,900	1914	565,000
1868	3,372,972	1884	736,165	1900	1,278,724	1915	770,000
1869	1,774,978	1885	713,738	1901	970,100	1916	580,500
1870	1,336,956	1886	903,651	1902	1,073,140	1917	496,000
1871	1,799,440	1887	693,709	1903	1,060,420	1918	320,000
1872	1,610,972	1888	616,731	1904	1,115,300	1919	286,500
1873	1,305,749	1889	588,923				
						Total	$75,722,603

TABLE VII.—PRODUCTION OF LODE MINES.

YEAR.	GOLD.		SILVER.		LEAD.		COPPER.		ZINC.		TOTAL VALUE.
	Oz.	Value.	Oz.	Value.	Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	
		$		$		$		$		$	$
1887	.....	.....	17,690	17,331	204,800	9,216	.....	.....	.....	.....	26,547
1888	.....	.....	79,780	75,000	674,500	29,813	.....	.....	.....	.....	104,813
1889	.....	.....	53,192	47,873	165,100	6,498	.....	.....	.....	.....	54,371
1890	.....	.....	70,427	73,948	*Nil.*	*Nil.*	.....	.....	.....	.....	73,948
1891	.....	.....	4,500	4,000	*Nil.*	*Nil.*	.....	.....	.....	.....	4,000
1892	.....	.....	77,160	66,935	808,420	33,064	.....	.....	.....	.....	99,999
1893	1,170	23,404	227,000	195,000	2,135,023	78,996	.....	.....	.....	.....	297,400
1894	6,252	125,014	746,379	470,219	5,662,523	169,875	324,680	16,234	.....	.....	781,342
1895	39,264	785,271	1,496,522	977,229	16,475,464	532,255	952,840	47,642	.....	.....	2,342,397
1896	62,259	1,244,180	3,135,343	2,100,689	24,199,977	721,384	3,818,556	190,926	.....	.....	4,257,179
1897	106,141	2,122,820	5,472,971	3,272,836	38,841,135	1,390,517	5,325,180	266,258	.....	.....	7,052,431
1898	110,061	2,201,217	4,292,401	2,375,841	31,693,559	1,077,581	7,271,678	874,781	.....	.....	6,529,420
1899	138,315	2,857,573	2,939,413	1,663,708	21,862,436	878,870	7,722,591	1,351,453	.....	.....	6,751,604
1900	167,153	3,453,381	3,958,175	2,309,200	63,358,621	2,691,887	9,997,080	1,615,289	.....	.....	10,069,757
1901	210,384	4,348,603	5,151,333	2,884,745	51,582,906	2,002,733	27,603,746	4,446,963	.....	.....	13,683,044
1902	236,491	4,888,269	3,917,917	1,941,328	22,536,381	824,832	29,636,057	3,446,673	.....	.....	11,101,102
1903	232,831	4,812,616	2,996,204	1,521,472	18,089,283	689,744	34,359,921	4,547,535	.....	.....	11,571,367
1904	222,042	4,589,608	3,222,481	1,719,516	36,646,244	1,421,874	35,710,128	4,578,037	.....	.....	12,309,035
1905	238,660	4,933,102	3,439,417	1,971,818	56,580,703	2,399,022	37,692,251	5,876,222	.....	.....	15,180,164
1906	224,027	4,630,639	2,990,262	1,897,320	52,408,217	2,667,578	42,990,488	8,288,565	.....	.....	17,484,102
1907	196,179	4,055,020	2,745,448	1,703,825	47,738,703	2,291 458	40,832,720	8,166,544	.....	.....	16,216,847
1908	255,582	5,282,880	2,631,389	1,321,483	43,195,733	1,632,799	47,274,614	6,240,249	.....	.....	14,477,411
1909	238,224	4,924,090	2,532,742	1,239,270	44,396,346	1,709,259	45,597,245	5,918,522	8,500,000	400,000	14,191,141
1910	267,701	5,533,380	2,450,241	1,245,016	34,658,746	1,386,350	38,243,934	4,871,512	4,184,192	192,473	13,228,731
1911	228,617	4,725,513	1,892,364	958,293	26,872,397	1,069,521	36,927,656	4,571,644	2,634,544	129,092	11,454,063
1912	257,496	5,322,442	3,132,108	1,810,045	44,871,454	1,805,627	51,456,537	8,408,513	5,358,280	316,139	17,662,766
1913	272,254	5,627,490	3,465,856	1,968,606	55,364,677	2,175,832	46,460,305	7,094,489	6,758,768	324,421	17,190,838
1914	247,170	5,109,004	3,602,180	1,876,736	50,625,048	1,771,877	45,009,699	6,121,319	7,866,467	346,125	15,225,061
1915	250,021	5,167,934	3,366,506	1,588,991	46,503,590	1,939,200	56,918,405	9,835,500	12,982,440	1,460,524	19,992,149
1916	221,932	4,587,334	3,301,923	2,059,739	48,727,516	3,007,462	65,379,364	17,784,494	37,168,980	4,043,985	31,483,014
1917	114,523	2,367,190	2,929,216	2,265,749	37,307,465	2,951,020	59,007,565	16,038,256	41,848,513	3,166,259	26,788,474
1918	164,674	3,403,812	3,498,172	3,215,870	43,899,661	2,928,107	61,483,754	15,143,449	41,772,916	2,899,040	27,590,278
1919	152,426	3,150,645	3,403,119	3,592,673	29,475,968	1,526,855	42,459,339	7,939,896	56,737,651	3,540,429	19,750,498
To'l	4,861,849	100,272,431	83,239,831	50,432,304	997,562,596	43,821,106	880,456,333	153,680,965	225,812,751	16,818,487	365,025,293

TABLE VIII.—COAL AND COKE PRODUCTION PER YEAR TO DATE.

COAL.

Year.	Tons (2,240 lb.).	Value.
1836-1881	1,873,907	$ 6,003,245
1882	282,139	846,417
1883	213,299	639,897
1884	394,070	1,182,210
1885	265,596	796,788
1886	326,636	979,908
1887	413,360	1,240,080
1888	489,301	1,467,903
1889	579,830	1,739,490
1890	678,140	2,034,420
1891	1,029,097	3,087,291
1892	826,335	2,479,005
1893	978,294	2,934,882
1894	1,012,953	3,038,859
1895	939,654	2,818,962
1896	896,222	2,688,666
1897	882,854	2,648,562
1898	1,135,865	3,407,595
1899	1,306,324	3,918,972
1900	1,439,595	4,318,785
1901	1,460,331	4,380,993
1902	1,397,394	4,192,182
1903	1,168,194	3,504,582
1904	1,253,628	3,760,884
1905	1,384,312	4,152,936
1906	1,517,303	4,551,909
1907	1,800,067	6,300,235
1908	1,677,849	5,872,472
1909	2,006,476	7,022,666
1910	2,800,046	9,800,161
1911	2,193,062	7,675,717
1912	2,628,804	9,200,814
1913	2,137,483	7,481,190
1914	1,810,967	6,338,385
1915	1,611,129	5,638,952
1916	2,084,093	7,294,325
1917	2,149,975	7,524,913
1918	2,302,245	11,511,225
1919	2,267,541	11,337,705
Total	51,614,370	$175,814,183

COKE.

Year.	Tons (2,240 lb.).	Value.
1895-97	19,396	$ 96,980
1898 (estimated)	35,000	175,000
1899	34,251	171,255
1900	85,149	425,745
1901	127,081	635,405
1902	128,015	640,075
1903	165,543	827,715
1904	238,428	1,192,140
1905	271,785	1,358,925
1906	199,227	996,135
1907	222,913	1,337,478
1908	247,399	1,484,394
1909	258,703	1,552,218
1910	218,029	1,308,174
1911	66,605	396,030
1912	264,333	1,585,998
1913	286,045	1,716,270
1914	234,577	1,407,462
1915	245,871	1,475,226
1916	267,725	1,606,350
1917	159,905	959,430
1918	188,967	1,322,769
1919	91,138	637,966
Total	4,055,475	$23,309,140

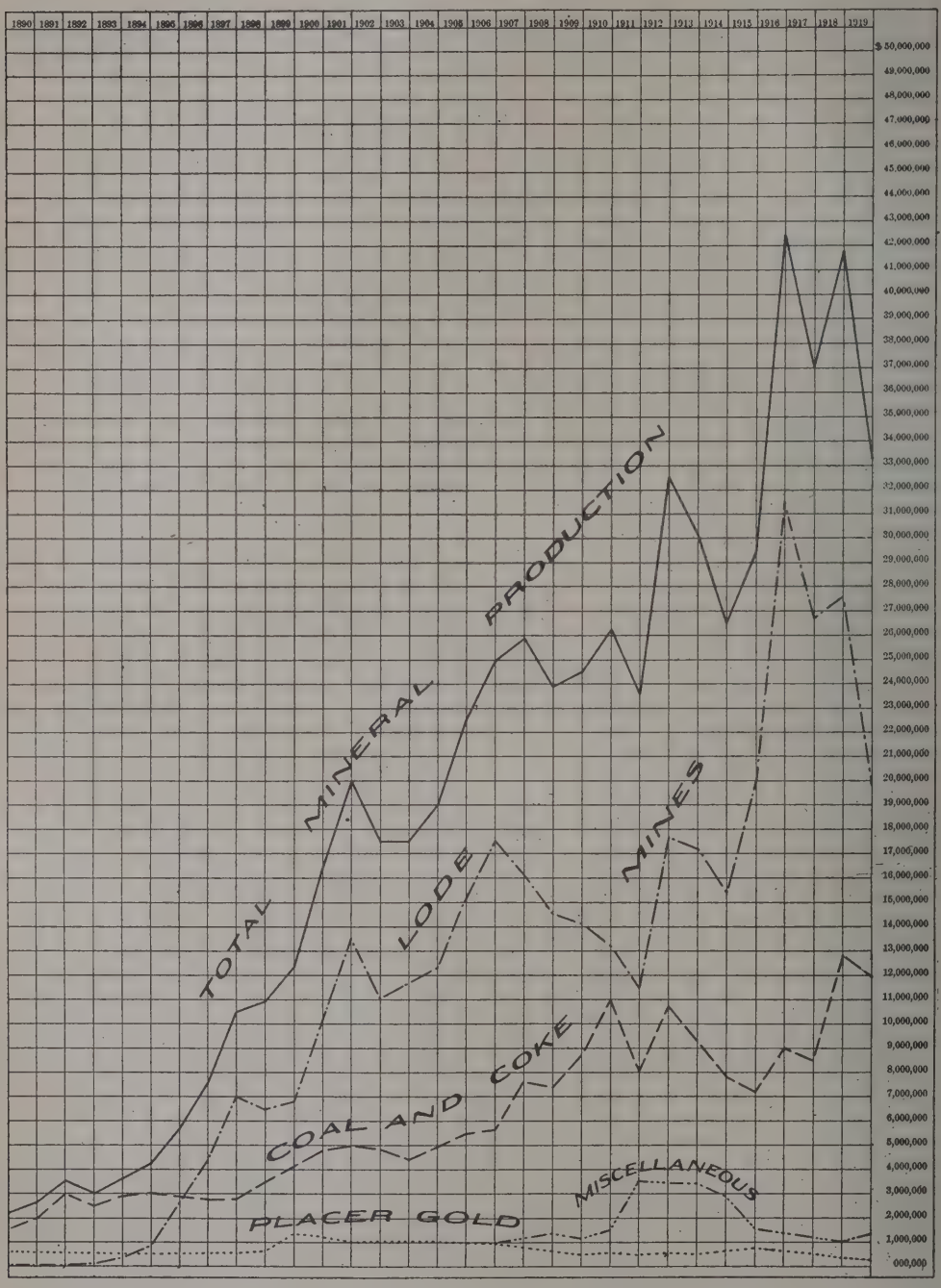
TABLE IX.—PRODUCTION IN DETAIL OF THE

DISTRICT.	YEAR	TONS.	GOLD—PLACER.		GOLD—LODE.		SILVER.	
			Ounces	Value.	Ounces.	Value.	Ounces.	Value.
				$		$		$
Cariboo								
Cariboo and Quesnel Divisions	1916		8,900	178,000				
	1917		7,500	150,000				
	1918		4,000	80,000				
	1919		3,500	70,000				
Omineca Division	1916	17,752	850	17,000	1,303	26,933	112,635	70,262
	1917	4,159	600	12,000	931	19,244	82,311	63,668
	1918	6,956	400	8,000	985	20,360	84,125	77,336
	1919	4,051	400	8,000	147	3,038	72,573	76,615
Cassiar								
Atlin, Stikine, and Liard Divisions	1916	262	18,025	360,500	736	15,213	3,054	1,905
	1917	33	15,600	312,000	1,000	20,670		
	1918	73	11,025	220,500	446	9,219	1,115	1,025
	1919		8,850	177,000				
Skeena, Nass, Portland Canal, and Queen Charlotte Divisions	1916	732,880			3,806	78,670	256,802	160,193
	1917	821,819			9,805	202,669	343,805	265,933
	1918	956,231			48,016	992,491	416,616	382,995
	1919	760,057	850	17,000	60,076	1,241,771	920,413	971,680
East Kootenay								
Fort Steele Division	1916	98,846	200	4,000			509,693	317,946
	1917	114,391	100	2,000			180,168	139,380
	1918	137,950	50	1,000			261,497	240,394
	1919	145,039	50	1,000			205,500	216,946
Windermere-Golden	1916	2,183					29,178	18,201
	1917	2,354					79,685	61,636
	1918	3,620					91,784	84,377
	1919	2,697			2	41	68,634	72,457
West Kootenay								
Ainsworth Division	1916	77,841			45	930	321,202	200,366
	1917	82,481			1	20	224,461	173,621
	1918	44,937			18	372	228,699	210,243
	1919	30,157			26	537	167,453	176,780
Slocan and Slocan City	1916	123,886			64	1,323	1,480,571	923,580
	1917	149,895			18	372	1,547,576	1,197,050
	1918	142,700			67	1,385	1,873,236	1,722,066
	1919	139,824			95	1,964	1,555,714	1,643,423
Nelson and Arrow Lake Divisions	1916	20,695	50	1,000	4,107	84,891	32,547	20,303
	1917	10,738	50	1,000	2,521	52,109	46,229	35,758
	1918	15,348	50	1,000	7,155	147,894	136,738	125,703
	1919	5,694	25	500	297	6,139	44,280	46,747
Trail Creek Division	1916	308,924			129,790	2,682,759	132,080	82,391
	1917	100,171			33,290	688,104	47,112	36,441
	1918	112,349			43,745	904,209	47,203	43,394
	1919	88,266			50,229	1,038,233	27,788	29,336
Revelstoke, Trout Lake, and Lardeau	1916	521	50	1,000	22	455	22,419	13,985
	1917	534	50	1,000	62	1,282	37,783	29,187
	1918	255	50	1,000	35	723	11,761	10,812
	1919	47	50	1,000	8	165	2,994	3,161
Boundary-Yale								
Grand Forks, Greenwood, and Osoyoos Divisions	1916	1,343,853	50	1,000	75,628	1,563,231	280,578	175,025
	1917	779,345	50	1,000	58,544	1,210,104	220,213	170,335
	1918	692,504	50	1,000	55,353	1,144,147	227,113	208,785
	1919	252,106	50	1,000	32,874	679,506	222,680	235,083
Similkameen, Nicola, and Vernon Divisions	1916	1,416	450	9,000	32	661	830	518
	1917	1,384	400	8,000	111	2,294	3,470	2,684
	1918	73	250	5,000	1	21	131	120
	1919	154	50	1,000	25	517	6,823	7,203
Yale, Ashcroft, and Kamloops Divisions	1916	7,414	150	3,000	570	11,782	4,215	2,629
	1917	8,254	100	2,000	1,355	28,008	3,525	2,727
	1918	30,826	50	1,000	815	16,846	1,317	1,211
	1919	29,871	100	2,000	627	12,960	2,096	2,213
Lillooet								
Lillooet and Clinton Divisions	1916	2,400	250	5,000	2,625	54,259		
	1917	4,700	300	6,000	3,092	63,912	276	213
	1918	3,858	50	1,000	2,473	51,117	412	379
	1919	4,720	375	7,500	2,506	51,799	365	385
Southern Coast								
Vancouver Island (Nanaimo, Alberni, Clayoquot, Quatsino, and Victoria Divisions)	1916	15,771	50	1,000	2,382	49,236	17,954	11,200
	1917	19,221	50	1,000	2,813	58,145	25,727	19,900
	1918	13,269	25	500	2,515	51,985	23,040	21,181
	1919	7,657	25	500	1,164	24,050	9,936	10,490
Mainland (Vancouver and New Westminster Divisions)	1916	434,064			822	16,991	98,165	61,235
	1917	662,100			980	20,257	86,925	67,236
	1918	731,900			3,050	63,043	93,385	85,849
	1919	642,635			4,350	89,915	94,870	100,154
TOTALS	1916	3,188,865	29,025	580,500	221,932	4,587,334	3,301,923	2,059,739
	1917	2,761,579	24,800	496,000	114,523	2,367,190	2,929,216	2,265,749
	1918	2,892,849	16,000	320,000	164,674	3,403,812	3,498,172	3,215,870
	1919	2,112,975	14,325	286,500	152,426	3,150,645	3,403,119	3,592,673

METALLIFEROUS MINES, ETC., FOR 1916, 1917, 1918, AND 1919

LEAD.		COPPER.		ZINC.		TOTALS FOR DIVISIONS.				TOTALS FOR DISTRICTS.
Pounds.	Value.	Pounds.	Value.	Pounds.	Value.	1916.	1917.	1918.	1919.	1919.
	$		$		$	$	$	$	$	$
										184,041
						178,000				
							150,000			
								80,000		
									70,000	
224,451	13,853	1,646,072	447,764	168,616	18,345	594,157				
271,885	21,506	852,373	231,675	364,097	27,548		375,641			
123,568	8,242	643,843	158,578	313,112	21,730			294,246		
180,455	9,347	16,205	3,030	224,539	14,011				114,041	
										6,224,387
7,260	448					378,066				
							332,670			
		11,160	2,749					233,493		
									177,000	
1,077	66	24,065,995	6,546,432			6,785,361				
		27,978,015	7,604,424				8,073,026			
		30,190,606	7,435,946					8,811,432		
		20,411,421	3,816,936						6,047,387	
										3,831,330
24,156,143	1,490,917	5,654	1,538	14,840,000	1,614,592	3,428,993				
13,996,640	1,107,134	9,679	2,631	20,715,090	1,567,304		2,818,429			
18,695,565	1,246,994	1,768	435	26,704,806	1,853,313			3,342,136		
10,729,433	555,787			46,460,703	2,899,148				3,672,881	
571,244	35,257	3,400	925	210,000	22,848	77,231				
1,774,649	140,375	12,640	3,436	18,000	1,362		206,809			
2,659,210	177,369							261,746		
1,659,279	85,951								158,449	
										4,659,099
7,841,869	484,000			625,971	68,106	753,402				
6,395,350	505,872			918,601	69,501		749,014			
6,106,262	407,288			640,991	44,485			662,388		
4,336,602	224,636			36,785	2,295				404,248	
14,415,645	889,734			17,854,357	1,942,554	3,757,191				
11,808,019	934,014			18,789,573	1,421,619		3,553,055			
14,575,379	972,178	242	60	14,107,682	979,073			3,674,762		
12,156,845	624,725			10,015,624	624,975				2,900,087	
1,240,784	76,582	176,383	47,980	3,470,036	377,540	608,296				
2,605,666	206,108	50,946	13,847	982,309	74,322		383,144			
1,611,166	107,465	28,933	7,126					389,188		
292,010	15,126	21,964	4,107						72,619	
		4,200,745	1,142,686			3,907,836				
		1,730,088	470,238				1,194,783			
		1,654,356	407,468					1,355,071		
		1,112,133	207,969						1,275,538	
206,741	12,760					28,200				
395,321	31,270			33,279	2,518		65,257			
80,773	5,387			6,325	439			18,361		
44,035	2,281								6,607	
										1,662,725
14,922	921	17,626,623	4,794,794			6,534,971				
36,543	2,891	10,329,765	2,807,630				4,191,960			
47,738	3,184	9,940,125	2,448,253					3,805,369		
43,200	2,238	3,273,655	612,173						1,530,000	
		182,633	49,680			59,859				
10,697	846	87,326	23,735				37,559			
		11,928	2,938					8,079		
4,594	238	5,180	969						9,927	
47,380	2,924	636,594	173,166			193,501				
12,690	1,004	700,199	190,314	27,564	2,085		226,138			
		525,780	129,500					148,557		
29,465	1,526	556,681	104,099						122,798	
										59,684
						59,259				
							70,125			
								52,496		
									59,684	
										3,415,732
		869,877	236,624			298,060				
		1,461,704	397,291				476,336			
		926,886	228,292					301,958		
		432,252	80,831						115,881	
		15,965,388	4,342,905			4,421,131				
		15,794,830	4,293,035				4,380,528			
		17,548,127	4,322,104					4,470,996		
		16,629,848	3,109,782						3,299,851	
48,727,516	3,007,462	65,379,364	17,784,494	37,168,980	4,043,985	32,063,514				
37,307,465	2,951,020	59,007,565	16,038,256	41,848,513	3,166,259		27,284,474			
43,899,661	2,928,107	61,483,754	15,143,449	41,772,916	2,899,040			27,910,278		
29,475,968	1,526,855	42,459,339	7,939,896	56,737,651	3,540,429				20,036,998	20,036,998

TABLE X.—SHOWING MINERAL PRODUCTION OF BRITISH COLUMBIA.



PROGRESS OF MINING.

The gross value of the mineral production of the Province for the year 1919 was $33,296,313, a decrease from that of the preceding year of $8,486,161, or equivalent to a decrease of about 20 per cent.

This decrease in production, as compared with the preceding year, loses its adverse significance when it is considered that the 1919 production is still materially greater than that of any year prior to 1916, and that the larger productions of the years 1916-17-18 were due to the stimulus of war and the inflated prices attendant thereon.

So that any feeling of regret at this year's output being less than that of the previous three years is completely obliterated by the consideration of the removal of the cause of the abnormal outputs of these three years—the war—and it becomes a matter of congratulation that, with the return of something approaching normal conditions, we should still find this year's mineral-output showing a very material increase over those of former normal years.

The gross value of the metallic minerals produced in 1919 was $20,036,998, which represents a decrease from last year of $7,873,280, a decrease of about 28 per cent.

It is apparent, therefor, that the decrease for the year is chiefly due to the smaller production of the metallic minerals from the lode mines, which calls for some explanation.

It will be noted from the accompanying table showing the details of production that this year's decrease is almost entirely due to copper—to the lesser quantity produced and the lower market price obtained for such product. To this must be added the consequent lessening of the production of both gold and silver to the extent that these metals would be contained in the decrease of tonnage of copper ore mined.

As the position of the copper-output is the important feature for consideration in this year's summary of production, it may be well to outline the conditions surrounding the marketing of this metal during the past few years.

Copper is such an essential war metal that all the Allied nations had felt obliged to accumulate within their borders a sufficient supply of the metal for war needs for a considerable time in advance, in case transportation facilities should cease.

The sudden coming of the Armistice in the fall of 1918 found all the great nations with these very large stocks of copper on hand, and no further demand for war supplies. It was estimated roughly that the stocks on hand were sufficient to supply the demands on a peace basis for about two years without further production by the mines.

As a consequence of the war the copper market of the world has been, during the whole of the year 1919, in a thoroughly demoralized condition and with no certainty as to the near future.

During the latter part of the war the market price of copper had been fixed by the United States Government, and, as the United States produces about two-thirds of the world's copper-supply, the American price formed the basis of the world price. The price thus set during the latter months of the war was 26 cents a pound at New York.

With the sudden disappearance of the cause of the great consumption, and with large stocks already distributed, it became at once evident that the fixed war price could not be maintained.

On the other hand, the producers, who had greatly increased their plants and outputs under the pressure of war's demands, found themselves with immense stocks on hand, and an accumulating increased output which had been produced under war conditions as to costs, and which they could not sell, except at a loss and much below the fixed war price.

The producers made an attempt, through combination, to maintain the fixed price, but the consumer did not have to buy, and consequently, as a matter of fact, practically no sales took place for some months around the end of 1918.

The great producers' combination immediately set about reducing their production to a point much below normal, hoping that the immediate coming of peace, with its expected greatly increased industries and the rehabilitation from war's devastations, would soon exhaust existing stocks.

This hope was to a great extent frustrated by the unexpected delay in settling the peace terms, and the slowness with which the expected rejuvenation of the peace industries has been taking place, due to the almost universal social unrest.

The burden of maintaining a profitable price over such an unexpectedly long time became too great for the producers, and they were, to a certain extent, forced to realize on their holdings at a reduced market price.

Whether the present price has reached bottom or whether it is being partially sustained artificially is unknown; hence the continuing demoralization of the market; but it seems certain that the present price obtainable is not high enough to permit of a continuation of production under the present scale of higher wages and high costs of necessary mining supplies. This latter phase is being reflected in a slightly rising market price during the last month of the year. Should this rise not continue until it reaches the present cost of production, it will mean continued curtailment of production and the eventual elimination of the less economically well-conditioned producers.

Such is the uncertainty attending the market conditions of the near future, in the light of which it is impossible to predict, with any degree of certainty, what output in copper our British Columbia mines will make during the coming year. Should the market price improve somewhat, or should the items affecting the cost of production diminish, we can confidently predict a much increased output, for the mines are in a position to make it, should the conditions render it commercially profitable so to do.

Generally the outlook for 1920 is most reassuring. The opening of new camps in the Portland Canal district has been the outstanding event of the past few months. There is no doubt that this district will be subjected to extensive prospecting and development this year. In short, there is every reason to believe that 1920 will be most important to the Province in point of mining development.

The production of gold, both placer and lode, shows a decrease of about $286,667, as is fully pointed out in the detailed notes on that metal. With the value of the product fixed, while the abnormally high prices of all items entering into the costs of production remain as they are, the condition of this branch of the industry never can be satisfactory.

The output of silver shows an increase as regards the value of the product. Silver is the only metal in the list the price of which may be considered abnormally high, and from the present outlook this high price seems likely to continue for some years, to the great advantage of the mines producing the metal.

In British Columbia our silver is almost entirely derived from ores carrying also other metals which have not increased in value.

The production of lead shows a decrease, due partly to strikes at some of the larger producing mines, and on account of the low price of the metal due to an overstocked market.

As regards quantity and value, zinc shows a largely increased production as compared with 1918. A considerable portion of the ore mined or concentrates produced found their way to the United States for smelting.

The collieries of the Province about held their own as far as production was concerned during the past year. The Coast collieries show an increase, but the Crowsnest collieries show a slight decrease in coal produced and a large decrease in the amount of coke produced, due to a long-continued period of labour trouble, to some extent due to the large percentage of aliens employed in and about these mines. Due to this fact the total value of the products of the collieries this year is about $858,323 less than in 1918.

Increases in the selling-prices of coal have been allowed at various times in the past few years by the Dominion Government Fuel Controller, until as nearly as can be calculated the average price of coal for the year, over the Province as a whole, has been about $5 a ton, and the similar average price for coke about $7 a ton.

The total gross amount of coal mined in the Province during the year was 2,408,948 tons (2,240 lb.), of which there was used for making coke some 141,407 tons, leaving a net production of coal, used as such, of 2,267,541 tons. The amount of coke produced was 91,138 tons (2,240 lb.). The increased selling-price of coal and coke has previously been discussed.

The value of the net coal production for the year was $11,337,705 and of coke $637,966, making the value of the production of the collieries $11,975,671.

British Columbia has very large areas of undeveloped and unprospected mineral lands, and the return of peace will hasten the development of her mineral resources. There will be a considerable accession to the ranks of the prospectors and more capital will be available for mining development.

The following table shows the number of mines which shipped ore during the year 1919, the districts in which they are situated, and the tonnage produced in each district, together with the number of men employed, both above ground and underground.

In explanation of the table it should be said that, in its preparation, a mine employing twelve men for four months is credited in the table with four men for twelve months, so that the total given is less than the actual number of individuals who worked in the mines during the year.

TABLE SHOWING DISTRIBUTION OF SHIPPING MINES IN 1919.

	Tons of Ore shipped.	No. of Mines shipping.	No. of Mines shipping over 100 Tons in 1919.	Men employed in these Mines.		
				Below.	Above.	Total.
CARIBOO DISTRICT:						
Omineca	4,051	5	1	13	44	57
CASSIAR DISTRICT:						
Atlin, Stikine	...	..	...	...	...	....
Queen Charlotte, Portland Canal, Skeena, and Nass River	760,057	12	7	397	313	710
EAST KOOTENAY DISTRICT:						
Fort Steele	145,039	4	3	217	166	383
Windermere-Golden	2,697	6	2	34	33	67
WEST KOOTENAY DISTRICT:						
Ainsworth	30,157	22	10	127	95	222
Slocan and Slocan City	139,824	33	20	417	206	623
Nelson and Arrow Lake	5,694	8	3	38	37	75
Trail Creek	88,266	5	5	249	89	338
Revelstoke, Lardeau, and Trout Lake	47	2	...	5	2	7
BOUNDARY-YALE DISTRICT:						
Greenwood, Grand Forks, and Osoyoos	252,106	29	11	290	170	460
Similkameen, Nicola, and Vernon	154	3	1	7	7	14
Yale, Ashcroft, and Kamloops	29,871	3	1	33	27	60
LILLOOET DISTRICT	4,720	4	4	12	17	29
SOUTHERN COAST DISTRICT, V.I.	7,657	7	5	22	50	72
SOUTHERN COAST, MAINLAND	642,635	1	1	385	276	661
Total	2,112,975	144	74	2,246	1,532	3,778

In the following table of the non-shipping mines the returns are necessarily incomplete, as they include only the mines reporting to the Department, and not the prospects and properties under preliminary development, which in the aggregate give employment to a large number of men.

TABLE SHOWING NON-SHIPPING MINES AND MEN EMPLOYED.

District.	Number of Mines.			Men employed.		
	Working.	Idle.	Total.	Below.	Above.	Total.
CARIBOO AND CASSIAR	11	15	26	46	23	69
EAST KOOTENAY	4	9	13	3	10	13
AINSWORTH	11	18	29	24	18	42
SLOCAN	16	22	38	82	48	130
NELSON	11	15	26	46	32	78
TRAIL CREEK	..	8	8	..	..	..
REVELSTOKE-LARDEAU	7	7	14	19	5	24
BOUNDARY-YALE	9	54	63	14	34	48
LILLOOET	1	4	5	2	..	2
SOUTHERN COAST	7	21	28	31	44	75
Total	77	173	250	267	214	481

SUMMARY OF STATISTICAL TABLES.

Referring to the preceding tables of the mineral production of the Province, the following is a summary of their contents:—

TABLE I. shows the total gross value of each mineral product mined in the Province up to the end of 1919, aggregating $670,649,894. From this table it will be seen that coal-mining has produced more than any other separate class of mining, a total of $199,123,323; followed next in importance by copper at $153,680,965, and next in order is lode gold at $100,272,431, with placer gold in fourth place at $75,722,603.

TABLE II. shows the value of the total production of the mines of the Province from 1852 to 1892 (inclusive) and for each year from 1893 to 1919 (inclusive), during which period the output increased tenfold, and reached a gross production for the year 1919 of $33,296,313.

The value of the total mineral production of the Province up to the end of 1919 was $670,649,894.

TABLE III. gives the quantities in the customary units of measure, and the values, of the various metals or minerals which go to make up the total of the mineral production of the Province, and also, for the purpose of comparison, similar data for the two preceding years.

The table shows that there has been this year a decrease in the production of placer gold of $33,500 and a decrease in output of lode gold of $253,167, making a total decrease of $286,667 in the total production of the precious metal.

The amount of silver produced this past year was 3,403,119 oz., having a gross value of $3,592,673, a decrease in the number of ounces produced of 95,053; but the value of the production in 1919 was $376,803 greater than in 1918, due to a prevailing higher market price for silver in 1919.

The table shows an output of lead amounting to 29,475,968 lb., valued at $1,526,855, a decrease of $1,401,252, due to the drop in the market price of the metal.

The production of copper this year was 42,459,339 lb., valued at $7,939,896, a decrease in amount of 19,024,415 lb., or about 30.9 per cent. The value of the product was less than that of the preceding year by $7,203,553, due to lower prices.

This decreased production of copper is the prominent feature of the year, and its cause has been noted previously in this Report and is further accounted for under the heading of "Copper."

TABLE IV. shows the proportions of the total mineral productions made in each of the various districts into which the Province is divided.

It will be noted that this year the Southern Coast District has again the honour of first place on the list, followed, in order of importance, by the East Kootenay, Cassiar, West Kootenay, and Boundary Districts. The Southern Coast and East Kootenay Districts owe a considerable proportion of their output to the coal-mines situated within their limits, whereas, in the other districts, the production is chiefly from metal-mining.

The Southern Coast District also derives a fair proportion of its production from "Miscellaneous products," such as building materials, etc., due to the larger cities therein; this year this amounted to $952,579, as shown in Table V.

TABLE V. is an endeavour to show in some detail the production of those products, such as building materials, previously summarized under "Miscellaneous products," and which amounts this year to $1,283,644. Much difficulty has been found in obtaining reliable figures regarding these products, and in many cases they have had to be estimated; but, while the figures are not as complete as desired, they are at least approximate, and show what an important branch of mineral production this has become, despite the falling-off due to the war and depressed financial conditions.

TABLE VI. shows the statistical record of the placer mines of the Province from 1858 to 1919, and shows a total production of $75,722,603. The output for 1919 was $286,500, a decrease, as compared with the previous year, of $33,500.

TABLE VII. relates entirely to the lode mines of the Province, and shows the quantities and values of the various metals produced each year since the beginning, in 1887, of such mining in the Province. The gross value of the product of these mines to date is $365,025,293; this figure includes the zinc production of 1909 and all subsequent years.

TABLE VIII. contains the statistics of production of the coal-mines of the Province. The total net amount of coal produced to the end of 1919 was 51,614,370 tons (of 2,240 lb.), worth

$175,814,183. Of this, there was produced in 1919, 2,267,541 tons valued at $11,337,705. In these figures of coal production the coal used in making coke is not included, as such coal is accounted for in the figures of output of coke. The amount of coal used in making coke in 1919 was 141,407 tons, from which was made 91,138 tons of coke, having a value of $637,966, a decrease in amount from the preceding year of 97,829 tons. The total value of the output of the collieries of the Province in 1919 was $11,975,671.

More detailed statistics as to the coal production of the Province and of the separate districts are given elsewhere in this Report.

TABLE IX. gives the details of production of metalliferous mines of the Province for the years 1916, 1917, 1918, and 1919, and the districts in which such productions were made, showing the tonnage of ore mined in each district, with its metallic contents and its market value.

The total tonnage of ore mined in the Province during the year 1919 was 2,112,975 tons, having a gross value of $19,750,498, and, with the placer gold, a total value of $20,036,998.

The following table shows the tonnage derived from the various districts of the Province:—

	Tons.
Cassiar and Omineca District	764,108
Southern Coast District	650,292
Boundary-Yale District	282,131
Slocan Mining Division	139,824
East Kootenay District	147,736
Trail Creek Mining Division	88,266
Ainsworth Mining Division	30,157
Nelson Mining Division	5,694
Other Mining Divisions	4,767
Total	2,112,975

In reports previous to 1910 there has been included in Table IX. the "Miscellaneous products," and in 1910 these were shown distributed to the various districts; the great increase of these products in the past few years has rendered it advisable that this table be reserved exclusively for metalliferous products, and so a new table (No. V.) was introduced in 1911, giving in some detail the output of these miscellaneous products.

In making comparisons of this table with similar tables in previous reports, the fact that "Miscellaneous" has been removed will have to be borne in mind.

TABLE X. presents in graphic form the facts shown in figures in the tables, and demonstrates to the eye the rapid growth of lode-mining in the Province, and also the fluctuations to which it has been subject.

It will be seen that, although coal-mining has been a constantly increasing industry during this whole period of twenty-six years, lode-mining did not begin, practically, until 1894, since when it has risen with remarkable rapidity, though not without interruption, until it reached, in 1906, the $17,500,000 line. The total mineral production in 1910 reached the $26,000,000 line, in 1912 it reached the $32,000,000 line, in 1916 the $42,000,000 line, while this year it is just a little above the $33,000,000 line.

GOLD.

Placer Gold. The recovery of placer gold for 1919 was $286,500, of which practically all was obtained in the Cariboo and Cassiar Districts, only about one-twentieth of the total coming from the other districts. An approximate apportionment is as follows: From Cariboo District, $78,000; Atlin, Stikine, and Liard Divisions of Cassiar District, $177,000; remaining parts of the Province, $31,500. This production for 1919 shows a decrease from the preceding year of $33,500, or about 11 per cent.

During the last four years the production of placer gold in the Province has steadily decreased. The chief reason is to be found in the economic conditions of high prices for labour and supplies, which made placer-mining less profitable than in former years. Shortage of labour also handicapped operations.

Information available regarding the Atlin Division shows that the production was considerably less than in 1918, and that some of the former operating companies were closed down during the year.

Gold from Lode-mining.

The value of lode gold produced in 1919 was $3,150,645, as compared with $3,403,812 in 1918, a decrease of $253,167, or nearly 8 per cent. The decrease in 1919 is due to a big reduction in output from the Boundary-Yale District, a decline of approximately $500,000 as compared with 1918. During the year the Granby Company closed its mines and smelter in this district and therefore only made a small production. The low-grade copper ore handled carries small gold and silver values, and in former years this gold production amounted to a considerable total. The *Nickel Plate* mine in this district also made a decreased production.

The Rossland mines, which prior to 1917 contributed annually about one-half of the output of lode gold, made about the same production in 1919 as in the preceding year; during these two years about one-quarter the normal output was made.

The following table shows the gold production of 1918 and 1919:—

	1918. Oz.	1919. Oz.
Cassiar District	48,016	60,076
Rossland	43,745	50,229
Boundary-Yale	56,169	33,526
Coast (Southern)	5,565	5,514
Lillooet	2,473	2,506
Nelson	7,155	297
All others	1,551	278
Totals	164,674	152,426

From the above table it will be seen that the only districts to show an increase are the Cassiar, Rossland, and Lillooet Districts. In the latter case the increase is small. The increase in Skeena is due to a larger output from the *Surf Inlet* mine, and the commencement of new shippers—namely, the *Premier* in the Salmon River section and the *Dolly Varden* mine in the Alice Arm section. The outlook for the future in this latter district is most promising and a largely increased production of gold and other metals may be expected.

The decrease in Nelson Division is large and is mainly due to the *Yankee Girl* mine being closed all year. Developments in this district at present under way may bring the production up again to that of former years.

The production of gold in British Columbia during each of the last three years has only been about one-half that of those years before the war, and shows that gold-mining in this Province has, as elsewhere in the world, been adversely affected by the conditions of high costs and a standard price for the product. Nevertheless, from the developments now in progress it would seem that in a short time the annual production of gold in British Columbia should increase considerably.

SILVER.

The quantity of silver produced was 3,403,119 oz., worth $3,592,673, a decrease from the production of 1918 in quantity of 95,053 oz., but, owing to the higher market value of silver, an increase in value of $376,803, or nearly 12 per cent.

The market price of silver gradually rose during the year, the average for January being 101.125 cents an ounce, while in December it was about 132 cents. The average for the year was 111.122 cents, the highest that silver has been for many years back. The prospect of silver maintaining its present price of well over $1 an ounce is good, and in this respect the silver market is in marked contrast to the other metals, the future prices of which are uncertain.

The following table shows the silver production for 1918 and 1919:—

	1918. Oz.	1919. Oz.
Slocan and Slocan City	1,873,236	1,556,714
Skeena	416,616	920,413
Boundary-Yale	228,561	231,599
Fort Steele	261,497	205,500
Ainsworth	228,699	167,453
Coast (Southern)	116,425	104,806
Omineca	84,125	72,573
Windermere-Golden	91,784	68,634
Nelson	136,738	44,280
All others	60,491	31,147
Totals	3,498,172	3,403,119

The above table shows an increase in the silver production from the Skeena and Boundary-Yale Districts and decreases in all the others.

Two factors have affected silver production during the year, one favourably and the other adversely. In the first place, the high market price of silver has been a great incentive to the mining of silver-bearing ores. On the other hand, the lessened demand and lowered market price of all other metals has led to the curtailment of output in many mining camps where silver is produced merely as a by-product. British Columbia has practically no mines producing exclusively silver, but the silver-lead-zinc ores of the Slocan District have a high percentage of their values in silver. In this connection it may be noted that about 75 per cent. of the total Provincial output of silver comes from the treatment of silver-lead-zinc ores and the balance mainly from the smelting of copper-gold-silver ores.

A reference to the notes on copper will show that the production of that metal has decreased this year about 31 per cent. as compared with last year, and, as all our copper ores carry some silver, the lessened tonnage of copper ores smelted has reduced the silver production by the amount of the content of such ores. Considering these facts, the production of silver in 1919 as compared with 1918 is gratifying.

Increased production was made in the Skeena District and is accounted for by new shippers entering the lists. Two of these, the *Premier* and the *Dolly Varden* mines, give promise of swelling the silver production very materially during future years.

The Slocan District is again far in the lead of all other districts in silver production, 46 per cent. of the total being credited to the Slocan.

The largest producers in the Slocan were the *Queen Bess*, *Bosun*, *Surprise*, *Hewitt-Van Roi*, *Silversmith*, and *Standard*. There were nearly forty shipping mines in the district in 1919.

In the Boundary District the chief producers were the *Bell*, *Granby-Phoenix*, and *Providence*. Other mines contributing are the *Sally*, *Emma*, and *Waterloo*.

The silver production from Trail Creek comes from the smelting of the gold-copper ores of Rossland camp, which carry about ½ oz. of silver to the ton.

The Coast production of silver comes from the smelting of copper ores carrying low values in the precious metals.

LEAD.

The total amount of lead produced in 1919 was 29,475,968 lb., valued at $1,526,855. This represents, as compared with the previous year, a decrease in quantity of 14,423,693 lb., and with the lower market price of lead a decrease in value of $1,401,252, or about 48 per cent.

During the first half of 1919 the market for lead was in a dull and demoralized condition owing to conditions arising from the sudden stopping of the war. Large stocks of lead were on hand for war purposes when the Armistice was signed, and also all lead-producers were speeded up to a high capacity. When the abnormal war demand for lead ceased, the market price dropped and production was curtailed until the surplus stocks were consumed by normal demand.

The Consolidated Mining and Smelting Company, which treats at its smelter and refinery at Trail nearly all the lead produced in Canada, was heavily stocked with lead when the year opened, and as a result had to refuse to take lead ore for some time from the mines.

During the year the lead market gradually adjusted itself to normal demands and now seems to be in a fairly healthy condition.

The average price of lead in January in New York was 5.432 cents a pound, and although fluctuating somewhat it was not until August that any material advance was made. Slight advances continued until the average for December was about 7 cents a pound. The average price for the year was 5.759 cents, as compared with 7.413 cents in 1918.

The following table shows the production of lead, according to districts, for the years 1918 and 1919:—

	1918. Lb.	1919. Lb.
Fort Steele	18,695,565	10,729,483
Slocan	14,575,379	12,156,845
Ainsworth	6,106,262	4,336,602
Windermere-Golden	2,659,210	1,659,279
Nelson	1,611,166	292,010
All others	252,079	301,749
Totals	43,899,661	29,475,968

From the above table it will be seen that the decrease in output was general in all districts, and shows that the different mines throughout the Province were forced to curtail their outputs.

The Slocan District was the heaviest producer in 1919, chiefly contributed by the *Queen Bess*, followed by the *Silversmith*, *Surprise*, *Bosun*, and the *Hewitt-Van Roi*.

The next largest producer was the Fort Steele Division; the *Sullivan* mine contributes nearly all of this production as a rule, but this year over 1,700,000 lb. came from the *North Star*.

In the Ainsworth Division the largest producer was the *Florence*, with an output of about 2,000,000 lb., followed by the *Whitewater*, with approximately 520,000 lb., and about twenty smaller shippers.

The lead production of Nelson Division was mainly from the *Molly Gibson* and the *Emerald* mines, and these mines produced less than in the previous year.

The production from Windermere-Golden was chiefly from the *Paradise* mine, with a production of about 1,340,000 lb., and five small shippers.

COPPER.

The amount of copper produced in 1919 shows, as compared with the previous year, a decrease in quantity, and, owing to the lower market selling-price, a larger proportionate decrease in value. The production was 42,459,339 lb., which is 19,024,415 lb. less than the 1918 output; the value for this year is $7,939,896, which, compared with $15,143,449 made in 1918, shows a decrease of $7,203,553, or about 47 per cent.

The demoralized condition of the copper market during 1919 has been referred to somewhat fully in the opening pages of this report, so that it is not necessary to further discuss it here, but some figures regarding the market price of the metal are given.

The year commenced with practically no sales of copper in January; in February the average price, according to the *Engineering and Mining Journal*, was 16.763 cents a pound. By August the price rose to 22.319 cents a pound, but to some extent the market was artificial, as the demand was very considerably less than the supply. From August to the end of the year the price declined again, and the average for December was about 18.5 cents a pound. In the last two weeks of the year the market appeared to have a healthier tone, and the price advanced slightly. The average price for the year was 18.69 cents a pound, as compared with 24.63 cents in 1918.

The following table shows the production of copper, according to districts, in 1918 and in 1919:—

	1918. Lb.	1919. Lb.
Skeena	30,190,606	20,411,421
Coast (Southern)	18,475,013	17,062,100
Boundary-Yale	10,477,833	3,835,516
Trail Creek Division	1,654,356	1,112,133
All others	685,946	38,169
Totals	61,483,754	42,459,339

From the above table it will be seen that there was a decrease in output from every district. In the Coast (Southern) District, the main producer was the *Britannia*, and this property mined and milled a larger tonnage in 1919 than in any previous year. Considering the adverse market conditions, this increased production of the *Britannia* mine shows the satisfactory condition of the property.

Early in the year the Granby Company was forced to close down the low-grade mines at Phoenix and smelter at Grand Forks, resulting in a great decrease in the copper production of Boundary-Yale District.

The Granby Company also curtailed production at the mines and smelter at Anyox, with the result that the copper production was about two-thirds that of last year.

The *Marble Bay* mine at Vananda was operated during the year, but a smaller production was made than in 1918.

The *Rocher Déboulé* mine, in Omineca Division, was closed all year, with the result that practically no copper was produced in that district.

ZINC.

The quantity of zinc produced in 1919 amounted to 56,737,651 lb., which, compared with 41,772,916 lb. produced in 1918, shows an increase of 14,964,735 lb. This production is valued at $3,540,429, which shows an increase, as compared with the 1918 value, of $641,389, or about 22 per cent.

The zinc market was not as much affected as the copper and lead markets by the transition period from war demands to peace conditions, with the result that the price of the metal did not fluctuate greatly and production continued uninterruptedly.

In January the average price of zinc in New York was 7.272 cents a pound; by May it had fallen to 6.429 cents, but thereafter gradually rose until the end of the year, the average for December being about 8.5 cents a pound. The average price of zinc for the year 1919 was 7.338 cents a pound, as compared with 8.159 cents for 1918.

It should be noted that the 1919 production of zinc is the highest, as to quantity, in the history of the Province.

The following table shows the production of zinc, according to districts, for 1918 and for 1919:—

	1918. Lb.	1919. Lb.
Fort Steele	26,704,806	46,460,703
Slocan	14,107,682	10,015,624
Omineca	313,112	224,539
Ainsworth	640,991	36,785
All others	6,325	.....
Totals	41,772,916	56,737,651

From the above table it is seen that the only district showing increased zinc production in 1919 was Fort Steele. The output in this district is made almost entirely by the *Sullivan* mine, and the increase was due to a larger tonnage being handled at the Consolidated Company's electrolytic zinc-refinery at Trail, where the ore is treated.

In the Slocan District the heaviest shipper was again the *Standard*, with a production of about 4,332,000 lb., which, however, is 2,000,000 lb. less than in 1918. The next largest shipper was the *Hewitt-Van Roi*, followed by the *Bosun*.

The Omineca production is mainly a silver-zinc concentrate from the *Silver Standard* mine at Hazelton.

OTHER MINERALS.

Iron. So far there has been no metallic iron produced in British Columbia, but it has been strongly advocated in many quarters that the conditions are favourable for the establishment of an iron-smelting plant somewhere on the British Columbia coast. So far nothing definite has materialized, although there is apparently a prospect of such a plant being established. As is well known, there is on the Coast, in the aggregate, an adequate supply of magnetite-iron ore, quite sufficiently free from impurities as to be within the "Bessemer limit" to supply ore for such a plant.

Important bodies of limonite ore have been discovered in the Chilcotin district, which were examined by Mr. Brewer, his notes on which are included in his report, published herein under heading of "District No. 6."

About 25 tons of magnetite was shipped by this Department from Texada island to Vancouver for an experiment in electric smelting by the Fleet process, from which process, however, no satisfactory results were obtained.

The Smelters Steel Company of Seattle, mined on the shore of Dean channel, in Bella Coola Mining Division, some 1,200 tons of magnetic-iron ore; most of this ore was transported by scows to Seattle, and assayed about 47 per cent. metallic iron. This company has erected near Seattle a portion of the first unit of a commercial-sized electro-thermic iron-smelting plant, in which there has been produced a few tons of exceedingly good metallic iron. This has demonstrated practically that iron and steel of excellent quality can be made direct from these ores.

Platinum. The well-known fact of the wide occurrence of platinum throughout the Province in connection with our placer-gold deposits gives reasonable hope that such may be found in payable quantities and justifies further investigations. As far as reports received indicate, the only output this year is about $1,500 worth from the Similkameen District, in which district the Dominion Government was last year making a search for the metal for war purposes, but this work has now ceased.

Molybdenite. Since the Armistice the market is dormant, like other metal prices, but nominal quotations vary from 75 cents to $1 a pound. No advice of any shipment this year has been received.

Chromite. In 1918 about 800 tons of chromite ore, carrying from 30 to 45 per cent. chromic oxide, was shipped from the *Mastodon* claim, Grand Forks Division; and a deposit on Scottie creek, near Clinton, was opened up, but no shipments were made. With the end of the war the market for chromite temporarily collapsed, as large stocks were available, with no purchasers in sight. It is believed that no ore was shipped in 1919.

Manganese. Nearly 600 tons of manganese ore, running over 50 per cent. manganese and less than 20 per cent. silica, was shipped from the *Hill 60* property on Cowichan lake before the roads became impassable through winter rains. The company is now arranging for the installation of an aerial tramway, which should prevent, in the future, interruption to sustained shipments. About 100 tons of high-grade manganese ore was also shipped from the Curle *Manganese* group near Kaslo. Both shipments went to the Bilrowe Alloys Company, of Tacoma.

Non-metallic Minerals. About 5,000 tons of fluorspar was shipped from the *Rock Candy* group, in the Grand Forks Division. This property is owned by the Consolidated Mining and Smelting Company and is being equipped to make steady shipments in the future. The mineral is shipped to the Trail smelter and is used for making hydrofluoric acid, which is used in the lead-refinery, and to other points in Canada and to the United States.

Shipments of magnesium sulphate (Epsom salts) were made from Spotted lake, Osoyoos Division, amounting to about 120 tons. Seven hundred and fifty tons of magnesium sulphate was shipped from deposits of this mineral near Clinton, and 140 tons from near Basque.

Deposits of hydromagnesite in the Clinton Division, which are reported to be large and of great purity, have attracted considerable attention during the past year. No shipments have been recorded.

A production of arsenic valued at $21,000 was made by the *Nickel Plate* mine in 1919.

COAL.

The gross production of coal in 1919 was 2,408,948 long tons, of which 141,407 tons was made into coke, leaving the net production at 2,267,541 tons. These figures show a decrease, as compared with 1918, of 169,776 tons gross and of 34,704 tons net. The quantity of coke made was 91,138 tons, which is a decrease of 97,829 tons as compared with 1918. For purposes of comparison the following table is shown:—

	1914.	1915.	1916.	1917.	1918.	1919.
Coal, gross.....tons, 2,240 lb..	2,166,428	1,972,580	2,485,580	2,398,715	2,578,724	2,408,948
Less made into coke "	355,461	361,451	401,487	248,740	276,479	141,407
Coal, net..... "	1,810,967	1,611,129	2,084,093	2,149,975	2,302,245	2,267,541
Coke made..... "	234,577	245,871	267,725	159,905	188,967	91,138

Summarizing the Provincial production of coal, the following table shows the output:—

	1916.	1917.	1918.	1919.
Vancouver Island mines.....tons, 2,240 lb.	1,492,761	1,695,721	1,666,211	1,699,348
Nicola and Similkameen mines..... "	110,549	151,243	179,179	149,042
Crowsnest mines..... "	882,270	551,751	732,864	558,806
Omineca-Telkwa ..... "	.....	.....	470	1,752
Total quantity of coal mined.. "	2,485,580	2,398,715	2,578,724	2,408,948
Less made into coke..... "	401,487	248,740	276,479	141,407
Net quantity of coal produced "	2,084,093	2,149,975	2,302,245	2,267,541

In addition to the above net production of coal, there was made the coke production shown in the following table:—

	1916.	1917.	1918.	1919.
Vancouver Island collieries.....tons, 2,240 lb.	27,604	30,406	24,887	34,071
Nicola and Similkameen collieries... "	*Nil*	*Nil*	*Nil*	*Nil*
Crowsnest District collieries..... "	240,121	129,499	164,080	57,067
Total coke production..... "	267,725	159,905	188,967	91,138

As will be seen from the above figures, the net coal production this year is 117,566 tons more than it was in 1917, and, with the exception of 1918, greater than it has been since 1912.

This output would have been considerably greater had not there been in the early part of the year labour troubles that interfered with production. All these contributed to occasion a shortage of both coal and coke when the demand was most keen.

The production of coke in 1919 was 91,138 tons (2,240 lb.), which is 97,829 tons less than the preceding year. Of this gross coke production, 57,067 tons was made by the Crow's Nest Pass Coal Company in East Kootenay, 14,865 tons by the Canadian Collieries at Comox, and 19,206 tons by the Granby Consolidated Mining, Smelting, and Power Company at Anyox.

The greater part of the gross Provincial coal production is still being mined by three companies—the Crow's Nest Pass Coal Company of East Kootenay, the Canadian Collieries (Dunsmuir), and the Canadian Western Fuel Company of Vancouver island, which mined, collectively, 82.2 per cent. of the gross output.

Of the other collieries: In the Coast District, on Vancouver island, the Pacific Coast Coal Mines, Limited, produced 65,843 tons; the British Columbia Coal Mining Company 36,995 tons; the Nanoose Collieries, Limited, 21,642 tons; and the Granby Company, from a new colliery near Cassidy, produced 72,885 tons. In the Nicola Valley section of the district, the Middlesboro Colliery Company mined 77,550 tons; the Fleming Coal Company 39,110 tons; the Princeton Coal and Land Company 22,193 tons; and the Coalmont Colliery some 10,189 tons of coal.

A new coalfield has been opened up in the Omineca District, where a small colliery is being developed on the Telkwa river that last year shipped 1,752 tons of coal. For convenience this has been included in the Coast District figures.

In the East Kootenay District, in addition to the Crow's Nest Pass Coal Company, which produced 479,059 tons, the Corbin Coal and Coke Company produced 79,747 tons.

The collieries of the Coast District, including the Nicola-Princeton fields, are to be credited this year with about 71 per cent. of the total coal-output.

The gross output of the collieries of the Province for the past year was, as already stated, 2,408,948 tons, of which 16,236 tons of coal was taken from stock.

Of this gross amount, there was sold for consumption in Canada, 1,057,404 tons; sold for consumption in the United States, 763,990 tons; sold in other countries, *nil;* making the total coal sales for the year 1,821,394 tons of 2,240 lb.

In addition to the coal sold, there was used in the manufacture of coke 141,407 tons, and used under companies' boilers, etc., 210,003 tons; while 252,380 tons was lost in washing and screening.

The coke sales of the Province for the past year amounted to 92,765 tons, of which 1,703 tons was taken from stock.

The following table indicates the markets in which the coal and coke output of the Province was sold:—

Coal.	Coast District.	Crowsnest Pass District.	Total for Province.
Sold for consumption in Canada ....tons, 2,240 lb.	991,477	65,927	1,057,404
" export to United States .... "	390,642	373,348	763,990
" export to other countries .... "	.....	.....	.....
Total coal sales	1,382,119	439,275	1,821,394
Coke.			
Sold for consumption in Canada ....tons, 2,240 lb.	35,635	48,996	84,631
" export to United States .... "	.....	8,134	8,134
" export to other countries .... "	.....	.....	.....
Total coke sales	35,635	57,130	92,765

Collieries of Coast District.

The Collieries of the Coast District, which includes those on Vancouver island and in the Nicola-Princeton fields, and a small colliery on Telkwa river mined 1,850,142 tons of coal in

1919, in addition to which 3,407 tons was taken from stock, making 1,853,549 tons distributed from these collieries in 1919. This amount was distributed thus:—

	Tons.	Tons.
Sold as coal in Canada	991,477	
Sold as coal in United States	390,642	
Sold as coal in other countries	.....	
Total sold as coal		1,382,119
Used under companies' boilers, etc.		163,378
Used in making coke		55,672
Lost in washing, etc.		252,380
		1,853,549
Minus coal taken from stock		3,407
Gross output		1,850,142

The total coal sales of the Coast collieries for the year show, as compared with the sales of the previous year, a decrease of 20,197 tons, equivalent to nearly 1.5 per cent.

The coal sold in Canada by the collieries of the Coast District this year shows an increase of 58,181 tons, or about 6.2 per cent. from the preceding year; the amount exported to the United States was 19,961 tons less than the preceding year, a decrease of about 4.8 per cent.

The coke produced in the Coast District in 1919 was 34,071 tons (2,240 lb.); the newly installed coke-ovens of the Granby Consolidated Mining, Smelting, and Power Company at Anyox producing 19,206 tons, and the Canadian Collieries (Dunsmuir), Limited, at Comox producing 14,865 tons. With the addition of 1,640 tons taken from stock, less 76 tons used under companies' boilers, the total sales of the Coast District for the year are shown at 35,635 tons—the highest on record.

On Vancouver island six companies produced coal this year—the Canadian Collieries, Limited, the Canadian Western Fuel Company, the Granby Consolidated Mining, Smelting, and Power Company, the Pacific Coast Coal Mines, the British Columbia Coal Mining Company, and the Nanoose Collieries, Limited; the majority of these companies each operate two, or more, collieries. The combined gross output of the Island collieries was 1,699,348 tons.

In the Nicola and Princeton coalfields of the Coast District, the Middlesboro Colliery Company produced 77,550 tons of coal; the Fleming Coal Company 39,110 tons; the Princeton Colliery, 22,193 tons; and the Coalmont Collieries, 10,189 tons.

The total output of this portion of the sub-district was 149,042 tons. The Telkwa Collieries produced 1,752 tons.

East Kootenay Coalfield.

There were only two companies operating in this district this past year—the Crow's Nest Pass Coal Company, operating two separate collieries, the combined output of which was 479,059 tons; and the Corbin Coal and Coke Company, which made an output of 79,747 tons; making a gross output for the district for 1919 of 558,806 tons of coal.

To the coal mined was added 12,829 tons taken from stock, making the amount of coal distributed from the collieries 571,635 tons.

Of this gross tonnage, 85,735 tons was used in the manufacture of coke, of which there was produced 57,067 tons (2,240 lb.).

The coke sold this year amounted to 57,130 tons, of which 63 tons was taken from stock.

The following table shows the distribution made of the coal of this district:—

	Tons.	Tons.
Sold as coal in Canada	65,927	
Sold as coal in United States	373,348	
Total sold as coal		439,275
Used by the companies in making coke		85,735
Used by the companies under boilers, etc.		46,625
		571,635
Minus coal taken from stock		12,829
Gross output		558,806

BUILDING MATERIALS.

The output during 1919 of structural materials, such as cement, lime, building-stone, sand and gravel, brick and other clay products, was considerably greater than in the preceding year, being $1,148,485 as against $940,891. The production of cement and brick individually is less than in 1918, but the greater increase in other materials, particularly in lime and limestone, brings the total production $207,594 above that of last year. Since 1912, when a production, amounting to $3,435,722 was recorded, the output of building materials steadily declined, due to the cessation of the building trade, brought about by the continued financial depression, and the war. It is probable that the figures of 1918 reached a minimum, and that an output amounting to about $1,000,000 represents the steady yearly demand for these materials for use in repairs, renewals, and various small demands, with but little new construction-work. It may be expected, therefore, that the production will remain at about this figure until a period of active construction-work again commences in the Province.

Approximately 80 per cent. of the total production of building materials comes from the Coast District, and the larger part of this finds its markets in the Coast cities.

In Table V., where the production of building materials is given in detail by districts, the column previously headed "Clay, Gypsum, etc.," was changed in 1916 to "Miscellaneous Minerals," this column being used for listing the production of hydromagnesite from Atlin, molybdenite from Skeena, Lillooet, Nelson, arsenic from Osoyoos, and antimony ore from Slocan. The column previously headed "Crushed Rock" was changed in 1917 to "Crushed Rock and Flux"; in it is recorded, in addition to the crushed rock, the value of limestone and quartz which are quarried for use at the smelters as flux.

Building-stone. Excellent building-stone of various sorts is found in abundance in almost every part of the Province; the fact of its widespread distribution has, however, been somewhat against the establishment of large quarrying industries, as a sufficient local supply could always be obtained, and, except within reach of the larger cities, few regularly equipped quarries have been opened.

On the Coast, chiefly between Vancouver island and the Mainland, there are several well-equipped quarries taking out granite, sandstone, and andesite, all of excellent quality. These quarries supply the stone building material of the Coast cities, and have also exported to the United States.

A detailed description of the more important quarries was given in the Report of this Bureau for 1904.

Red Brick. The sale of red brick during the past year was about 5,100 M.; the price varies from $12 to $15 a thousand, according to quality and demand. This small output shows very clearly that but little construction-work has been carried on. It is probable, however, that a considerable quantity of brick is still imported into the Province.

Firebrick. The only company producing firebrick in the Province is the Clayburn Company, Limited, with a plant at Clayburn. The fireclay is found here as a bed occurring in bedded rocks of Eocene age. Shales, sandstones, and conglomerates, all but little consolidated, make up this sedimentary series. The shales are quarried or mined for brick-making and one bed is an excellent fireclay. Associated with these rocks is a bed of lignite which is sufficiently good to be used for firing the boilers of the plant. The production of this company was somewhat less than in 1918. Firebrick is the principal manufactured article produced by this company, but, in addition, considerable quantities of common brick, paving-brick, tiles, drain-pipes, and prepared fireclay are made.

Lime. The manufacture of lime is conducted in a small way at a large number of points in the Province, but only on the Coast has any attempt been made at more extensive operations. In the neighbourhood of Victoria, on Esquimalt harbour, three kilns are in operation, and there is a kiln on Saanich arm. On Texada island—in addition to the old plant at Marble bay—a new and extensive plant was erected at Blubber bay a few years ago. The limestone being used is of exceptional purity, but in some instances the limestone-beds are cut by igneous dykes which have to be rejected, and this somewhat increases the cost of quarrying.

The production of lime and limestone for 1919 is valued at $204,538, as compared with $28,536 in 1918, and in addition about $60,000 worth of limestone was quarried for use as smelter flux by the Granby and Consolidated Companies and a certain amount quarried by the paper and pulp mills for their own use.

Portland Cement.

There were two large and well-equipped cement plants in the Province, both situated on Saanich inlet. These two concerns have recently been amalgamated under the name of the British Columbia Cement Company, with plant at Tod inlet, which made a production in 1919 of over $260,000. Portland cement is thus the most important item in the production of building materials.

Crushed Rock and Gravel.

The returns for crushed rock and gravel indicate an increased demand for this material, although some of the plants have not been in operation for the past two or three years. During the boom years of 1911 and 1912 a number of well-equipped plants were put up near Vancouver and Victoria for supplying washed sand and gravel, properly screened to size. Some of these companies use a system of mining the gravel by hydraulic streams and carrying the product to the screens by the water used. Practically all of these plants are now idle, as there is but little demand for sand and gravel.

BUREAU OF MINES.

WORK OF THE YEAR.

The work of the Bureau of Mines naturally increases year by year, this growing activity being due to the following causes: The extension of the mining area of the Province, with the proportional increase in the number of mines; the increasing desire of the outside public for the free information which the Bureau supplies with regard to the various mining districts and camps, and the appreciation by the prospector of the fact that he may obtain, gratis, a determination of any rock or mineral which he may send to the Bureau.

The routine work of the office, and the preparation and publication of the Report for the year just ended, followed by the examination in the field of as many of the mines and mining districts as the season would permit, together with the work of the Laboratory, fully occupied the staff for the year.

The permanent staff of the Bureau now consists of the Provincial Mineralogist and Assayer, Wm. Fleet Robertson; the Assistant Provincial Assayer and Provincial Analyst, D. E. Whittaker; and John Adams as Laboratory Assistant.

Major Nation, who went overseas in 1914, returned in September, 1917, and resumed his position as general office assistant.

Aside from his usual duties, the Provincial Mineralogist was occupied for three months, during the absence of the Deputy Minister on sick leave, as Acting Deputy Minister of Mines.

During the session of 1917 the Hon. the Minister of Mines brought in the "Mineral Survey and Development Act," which was passed on May 19th, 1917, and under the provisions of which the Province was divided into six Mineral Districts, to each of which there was appointed a Resident Engineer with headquarters at a centrally located point in such district.

In the district to which he was appointed the Resident Engineer is expected to devote his whole time to the performance of the duties of his office, and to carry on continuously a mineral survey of his district, keeping records of the same and of the mining and mineral developments taking place, and at the same time to assist prospectors and others with such advice as may be necessary and may come within the scope of a mining engineer's work.

Aside from special reports which may be called for by the Minister, the Resident Engineers are expected annually to make a comprehensive report covering all matters relating to mining, mine development, and prospecting that have occurred within the year in their respective districts.

These annual reports of the Resident Engineers are given later in this general Report, and form the basis of the information given in respect to the mineral industry and its development within the Province.

MINERAL SURVEY DISTRICTS AND RESIDENT ENGINEERS THEREOF.

The following are the six Mineral Districts into which the Province is divided, with the Mining Divisions included in each and the location of the permanent office of the district, with the name of the Resident Engineer appointed to each district:—

District No. 1.—The North-western Mineral Survey District shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Atlin, Stikine, Liard, Skeena, Nass River, Portland Canal, Bella Coola, and Queen Charlotte; and shall have its permanent survey station and office at the City of Prince Rupert. Resident Engineer, Geo. A. Clothier, B.Sc.

District No. 2.—The North-eastern Mineral Survey District shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Omineca, Peace River, Cariboo, and Quesnel; and shall have its permanent survey station and office at Hazelton. Resident Engineer, John D. Galloway, M.Sc.

District No. 3.—The Central Mineral Survey District shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon, and Yale; and shall have its permanent survey station and office at the City of Kamloops. Resident Engineer, R. W. Thomson.

District No. 4.—The Southern Mineral Survey District shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Similkameen, Greenwood, Grand Forks, and Osoyoos; and shall have its permanent survey station and office at the City of Grand Forks. Resident Engineer, Philip B. Freeland.

District No. 5.—The Eastern Mineral Survey District shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Golden, Windermere, Fort Steele, Ainsworth, Slocan, Slocan City, Trout Lake, Nelson, Arrow Lake, Revelstoke, Lardeau, and Trail Creek; and shall have its permanent survey station and office at the City of Revelstoke. Resident Engineer, A. G. Langley, B.Sc.

District No. 6.—The Western Mineral Survey District shall consist of that portion of the Province contained within the following Mining Divisions, that is to say: Nanamo, Alberni, Clayoquot, Quatsino, Victoria, Vancouver, and New Westminster; and shall have its permanent survey station and office at the City of Nanaimo. Resident Engineer, W. M. Brewer.

ASSAY OFFICE.

The following is a summary of the work of the Assay Office of the Bureau of Mines for the year 1919 as reported by the Assistant Provincial Assayer, D. E. Whittaker:—

During the year 1919 there were made by the staff in the Government Assay Office 2,986 assays or quantitative determinations; of these the majority were for the Bureau of Mines or for the other departments, for which no fees were received.

The fees collected by the office were as follows:—

Fees for analyses	$ 763 20
Fees for assaying	188 70
Fees for assayers' examinations	270 00
Fees, gold bullion	74 04
Total cash receipts	$1,295 94

Determinations and examinations made for other Government departments for which no fees were collected—

Attorney-General's Department	$ 669 00
Agricultural Department	435 00
Board of Health	140 00
Treasury Department	83 00
Other departments	320 00
	$1,647 00
Value of work done outside of Mines Department work	$2,942 94

The value of gold melted during the year 1919 was $16,182 in 23 lots, as against $4,276 in 33 lots in 1918.

Free Determinations.

In addition to the above quantitative work, a large number of qualitative determinations, or tests, were made in connection with the identification and classification of rocks or minerals sent to the Bureau for a report; of these no count was kept, nor were any fees charged, as it is the established custom of the Bureau to examine and test qualitatively, without charge, samples of minerals sent in from any part of the Province, and to give a report on the same. This has been done for the purpose of encouraging the search for new or rare minerals and ores, and to assist prospectors and others in the discovery of new mining districts, by enabling them to have determined, free of cost, the nature and probable value of any rock they may find. In making these free determinations, the Bureau asks that the locality from which the sample was obtained be given by the sender.

EXAMINATIONS FOR ASSAYERS.

REPORT OF D. E. WHITTAKER, SECRETARY OF BOARD OF EXAMINERS.

I have the honour, as Secretary, to submit the Annual Report for the year 1919 of the Board of Examiners for Certificates of Competency and Licence to Practise Assaying in British Columbia, as established under the "Bureau of Mines Act Amendment Act, 1899."

Examinations were held in Victoria, in the Government Laboratory, on May 16th, July 24th, and December 19th and the following days. Thirteen candidates came up for examination, and ten obtained the required number of marks; the Board recommended that a Certificate be granted to them. No candidates applied for exemption under section 2, subsection (2), of the Act.

In accordance with the recommendations of the Board, Certificates have been duly issued by the Honourable the Minister of Mines to the ten candidates.

LIST OF ASSAYERS HOLDING PROVINCIAL CERTIFICATES OF EFFICIENCY UNDER THE "BUREAU OF MINES ACT AMENDMENT ACT, 1899."

(Only the holders of such certificates may practise assaying in British Columbia.)
Under section 2, subsection (1).

Adams, J. B.	Victoria.
Archer, E. G.	Anyox.
Armstrong, N.	Vancouver.
Ayres, D. A.	
Austin, John W.	Vancouver.
Backus, Geo. S.	Britannia Beach.
Baker, C. S. H.	
Barke, A. C.	
Bernard, Pierre	Monte Christo, Wash.
Bishop, Walter	Grand Forks.
Buchanan, James	Trail.
Buehman, A. S.	Trail.
Campbell, Colin	New Denver.
Carmichael, Norman	Clifton, Arizona.
Church, George B.	
Cobeldick, W. M.	Scotland.
Collison, H.	Cobham, England.
Comrie, George H.	Vancouver.
Craufurd, A. J. F.	Rossland.
Crerar, George	
Cruickshank, G.	
Davidson, J. R.	Vancouver.
Day, Athelstan	Dawson.
Dedolph, Ed.	
Dockrill, Walter R.	Chemainus.
Dunn, G. W.	Rossland.
Farquhar, J. B.	Vancouver.
Fingland, John J.	Kaslo.
Grosvenor, F. E.	Vancouver.
Hamilton, Wm. J.	Anyox.
Hannay, W. H.	Rossland.
Harsant, R. C. C.	Port Essington.
Hart, P. E.	
Hawkins, Francis	Silverton.
Hawes, F. B.	Vancouver.
Hodgson, A. R.	Anyox.
Hook, A. Harry	Greenwood.
Hurter, C. S.	Prince Rupert.
Irwin, George E.	Vancouver.
John, D.	Haileybury, Ont.
Kiddie, Geo. R.	California.
King, R.	
Kitto, Geoffrey B.	Victoria.
Langley, A. S.	Crofton.
Lee, Fred E.	Trail.
Lee, Geo. M.	Grand Forks.
Ley, Richard H.	Victoria.
Levy, Frank	
Lindsay, W. W.	Kimberley.
Longworth, F. J.	Boyds, Wash.
Laucks, I. F.	Seattle.
Manning, S. M.	Trail.
Martin, S. J.	
Marsh, Richard	Republic, Wash.
Marshall, H. Jukes	Vancouver.
Marshall, William S.	Ladysmith.
Meale, Eric A.	East Helena, Mont.
Merrifeld, T. T.	Trail.
Miles, Arthur D.	
Milne, A. S.	Vancouver.
Mitchell, Charles T.	Copper Cliff, Ont.
McCormick, Alan F.	Ruth. Nevada.
MacDonald, Alec C.	Vancouver.
McLellan, R. D.	Vancouver.
Morgan, Richard	Trail.
Nicholls, Frank	Norway.
Parker, Robt. H.	
Parsenow, W. L.	
Perkins, Walter G.	
Pickard, T. D.	Vancouver.
Pirrie, Noble W.	Ottawa.
Poole, H. W.	Vancouver.
Prior, C. E.	Hedley.
Richmond, Leigh	Duncan.
Robertson, T. R.	
Rodgers, Ch. B.	Vancouver.
Rombauer, A. B.	Butte, Mont.
Schroeder, Curt. A.	
Segsworth, Walter	Toronto, Ont.
Shepherd, G. H.	North Vancouver.
Sharpe, Bert N.	
Shore, J. T.	Vancouver.
Sim, Chas. John	Monte Carlo.
Sloan, Wm.	Vancouver.
Snyder, Blanchard M.	
Steven, Wm. Gordon	
Stimmel, B. A.	Trail.
Stockly, Galt	Princeton.
Sundberg, Gustave	Mexico City.
Tally, Robert E.	Spokane, Wash.
Taylor, H. L.	Vancouver.
Thomas, Percival W.	Vancouver.
Tretheway, John H.	
Turner, H. A.	Vancouver.
Vance, John F. C. B.	Vancouver.
Van Agnew, Frank	Siberia.
Vaughan-Williams, V. L.	California.
Wales, Roland T.	

Watson, Wm. J. ..... Ladysmith.
Watson, Thomas ..... Vancouver.
Welsh, J. Cuthbert ..... Butte, Mont.
Wells, Ben T. .....
West, Geo. G. ..... Vancouver.
Whittaker, Delbert E. ..... Victoria.
Widdowson, E. Walter .... Nelson.
Williams, W. A. ..... Vancouver.
Williams, Eliot H. .....
Williams, J. R. ..... Vancouver.
Wimberley, S. H. ..... Nevada, U.S.A.

Under section 2, subsection (2).

Archer, Allan .....
Baylock, Selwyn G. ..... Trail.
Bissett, D. G. ..... Trail.
Bolton, George E. ..... Silverton.
Brennan, Charles Victor ... Victoria.
Browne, R. J. ..... Rossland.
Browne, P. J. ..... Nelson.
Bryant, Cecil M. .....
Burwash, N. A. .....
Cavers, Thomas W. .....
Clothier, George A. ..... Prince Rupert.
Cole, Arthur A. ..... Cobalt, Ont.
Cole, G. E. ..... Rossland.
Cole, L. Heber ..... Ottawa, Ont.
Conway, E. J. ..... Vancouver.
Coulthard, R. W. .....
Cowans, Frederick .....
Dawson, V. E. ..... Trail.
Dempster, R. C. ..... Rossland.
Dempster, A. S. ..... Rossland.
Dixon, Howard A. ..... Toronto, Ont.
Eardley-Wilmot, V. L. .... Rossland.
Eldridge, Gardner S. ..... Vancouver.
Galbraith, M. T. .....
Gilman, Ellis P. ..... Vancouver.
Green, J. T. Raoul ..... Blairmore, Alta.
Guess, George A. ..... Toronto, Ont.
Gwillim, J. C. ..... Kingston, Ont.
Harding, Wilson M. .....
Heal, John H. .....
Hearn, Roy D. ..... Trail.
Hilliary, G. M. ..... Idaho, U.S.A.
Johnston, William Steele .. Lachine, Que.
Kaye, Alexander ..... Vancouver.
Kendall, George ..... Vancouver.
Kidd, G. L. ..... Edmonton, Alta.
Kilburn, Geo. H. ..... Rossland.
Lathe, Frank E. ..... Grand Forks.
Lay, Douglas .....
Lewis, Francis B. ..... South Africa.
Merrit, Charles P. .....
Murphy, C. J. ..... St. Catharines, Ont.
Musgrave, W. N. ..... England.
McArthur, Reginald E. ....
McDiarmid, S. S. .....
McGinnis, Wm. C. ..... Queen Charlotte Ids.
McKay, Robt. B. ..... Vancouver.
McLellan, John ..... Queen Charlotte Ids.
McMurtry, Gordon O. .....
McNab, J. A. ..... Thompson, Nevada.
McPhee, W. B. .....
McVicar, John ..... Edmonton, Alta.
Maclennan, F. W. .....
Moran, P. J. ..... Vancouver.
Newton, W. E. ..... Sandon.
Oughtred, S. W. ..... Ainsworth.
Outhett, Christopher ..... Kamloops.
Pemberton, W. P. D. ..... Victoria.
Reid, J. A. ..... Cobalt, Ont.
Ritchie, A. B. ..... Nelson.
Roaf, J. R. .....
Rose, J. H. ..... Thompson, Nevada.
Rutherford, R. C. ..... Trail.
Sampson, E. H. S. ..... Riondel.
Scott, Oswald Norman ....
Shannon, S. .....
Sharpe, G. P. ..... Midland, Ont.
Shorey, P. M. ..... Trail.
Sloan, David ..... Three Forks.
Stevens, F. G. ..... Mexico.
Stroud, J. E. C. ..... Anyox, B.C.
Sullivan, Michael H. ..... Kellogg, Idaho.
Sutherland, T. Fraser .....
Sutherland, Wm. ..... Glasgow, Scotland.
Swinney, Leslie A. E. .....
Thompson, W. K. ..... Trail, B.C.
Thomson, H. Nellis ..... Anaconda, Montana.
Thomson, Robt. W. .....
Watson, A. A. .....
Watson, Henry .....
Willis, F. S. ..... Trail.
Winslow, R. H. ..... Vancouver.
Wilson, Ridgeway R. ..... Fernie.
Workman, Ch. W. .....
Wright, Richard ..... Rossland.
Wynne, Lewellyn C. .....
Yuill, H. H. .....

Under section 2, subsection (3).

Carmichael, Herbert ..... Victoria.
Galloway, J. D. ..... Victoria.
(Resident Engineer.)
Harris, Henry ..... Tasmania.
Hedley, Robt. R. ..... Vancouver.
Kiddie, Thos. ..... California.
Marshall, Dr. T. R. ..... London, England.
McKillop, Alexander ..... Vancouver.
Pellew-Harvey, Wm. ..... London, England.
Robertson, Wm. Fleet ..... Victoria.
(Provincial Mineralogist.)

Previously issued under the "Bureau of Mines Act, 1897," section 12.

Pinder, W. J. .....
Thompson, James B. ..... Vancouver.

NORTH-WESTERN DISTRICT (No. 1).

REPORT OF GEO. A. CLOTHIER, RESIDENT ENGINEER.

INTRODUCTORY.

The North-western Mineral Survey District is comprised of eight of the Mining Divisions of the Province—namely, Skeena, Portland Canal, Nass River, Bella Coola, Queen Charlotte, Stikine, Liard, and Atlin. The first five include the northern coast portion of the Province, from Seymour inlet north to the Unuk river; and the last three, all the northern interior part of the Province to the Yukon-British Columbia boundary-line.

For the purposes of this report the district will be considered under the main headings of the Mining Divisions, subdivided into sections, as follows:—

Bella Coola Mining Division.

Queen Charlotte Mining Division.

Skeena Mining Division—Coast section; Grand Trunk Pacific section; Kitsumgallum Valley section; Lakelse Valley (Thornhill Mountain) section.

Portland Canal Mining Division—Portland Canal section; Marmot River section; Bear River section; Salmon River section.

Nass River Mining Division—Observatory Inlet section; Alice Arm section; Kitsault River section; Illiance River section; Unuk River section.

Stikine Mining Division—Stikine River section; Iskut River section.

Liard Mining Division—Dease Lake section.

Atlin Mining Division—Rainy Hollow section; Atlin section.

It has been pointed out in former reports that this district has many distinctive features, both geologic and geographic, that are exceptionally advantageous and desirable to the prospector and the mine operator.

The following brief outline of the general geological conditions show them to be very favourable for the occurrence of the economic minerals. The district may be divided into three, broad, parallel belts or zones, each with its own characteristic ore occurrences, as follows: (1) The Main Coast Range; (2) the Westen Contact Belt; (3) the Eastern Contact Belt.

(1.) The Coast range, consisting of granodiorite, extends the full length of the Province, crossing the British Columbia boundary-line into the Yukon at the head of Lynn canal, and it is from thirty to one hundred miles in width.

This belt of massive granite has, as such, been rather shunned by prospectors, who, as a rule, consider this formation "no good," or at least unfavourable for mineral-deposits. The fallacy of this opinion has, however, been demonstrated by the number of meritorious prospects that have been discovered, one of which has developed into a valuable producing mine.

Its importance from a prospecting standpoint is exemplified in such showings as the magnetite veins on Seymour and other inlets in the Bella Coola Mining Division; the quartz veins of the Belmont-Surf Inlet Mines, Limited, on Princess Royal island, which occur in a shear-zone in the granite, the shearing action providing the channel through which the siliceous and mineral-bearing solutions have circulated and deposited their loads; the *Drum Lummon* property, on Douglas channel, representing replacement veins following along acidic dykes which have penetrated the granite; the immense pyrite-deposits, carrying chalcopyrite, on the Ecstall river, contained in a belt of schists enclosed in the granite; the *Hidden Creek* mines of the Granby Company at Anyox; the *Outsider* and *Maple Bay* groups at Maple bay, on Portland canal, in the same formation; the Georgia River Mining Company's showings, which are apparently filled fissures in the solid granite, each representing a different class of ore-deposit that may be found in the Coast range.

Of the enclosed sedimentaries within the granite, F. E. and C. W. Wright* say: "Within the granite area itself are occasional belts of sedimentary rocks in a highly metamorphosed condition. They vary from argillites to mica, hornblende and calcareous schists of various types,

* Bulletin No. 347, U.S. Geological Survey.

even marble, and occur in long bands intensely folded. These included schist-belts are usually not wide and more appear near the mountain-tops than at sea-level. They are usually intensely mineralized with sulphides, especially pyrite, and near the mountain-tops show abundant evidence of contact metamorphism. Tney were directly above the intrusive mass and were evidently in the most favourable position to be affected by magmatic waters and heat escaping from the intrusives, so that they are the most heavily mineralized bodies."

(2.) The Western Contact Belt borders the Coast range on its western side, and in this district extends from the head of Vancouver island north to the southern boundary of the Alaska strip. Portions of the Coast, the majority of the off-shore islands, and the Queen Charlotte group of islands, though the northern extension of the Vancouver range, will for the purposes of this report all be included in this belt.

The rock formation is essentially sedimentary, highly metamorphosed at and near the contact with the granite and intruded by many spurs and isolated masses from the main granite Coast range, as well as cut by many dykes of all kinds of igneous rocks; all tending to produce conditions exceptionally conducive to the circulation of mineral-bearing solutions and ore-deposition.

Excerpts from F. E. and C. W. Wright's report state: "It is probable that at many points along the western flanks of the batholiths (granites) the schists now visible were so deeply buried at the time of the intrusion that the invading granite did not alter them so materially as to produce wide contact change. Strata nearer the surface at the time of intrusion should show more pronounced alteration from the magmatic solutions and the heat. It is significant that in these deep-seated schists and gneisses near the granite-contact no ore-bodies of consequence have been found, while rocks farther away from the granite and nearer the surface during its invasion in many localities show traces of contact metamorphism, as in spotted schists, and contain valuable metalliferous deposits."

The Prince Rupert schists, so termed by McConnell,* made up largely of crystallized mica and hornblende schists, passing in places into fine-grained gneisses and greyish and white crystalline limestone, extend south in a wide band from Prince Rupert to some distance below Klewnuggit, on the east shore of Grenville channel. The belt is about twelve miles wide at the mouth of the Skeena river and gradually narrows down Grenville channel.

A glance at the map will convince any one of the ideal natural prospecting conditions and transportation facilities furnished in this Western Contact Belt. Any point on the Coast or off-shore islands is easily reached from the many canneries and sawmilling camps scattered along the Coast, which are calling-ports for Coast-plying steamers. The Queen Charlottes have a weekly service from Vancouver and Prince Rupert.

(3.) The Eastern Contact Belt, as the name signifies, borders the Coast range on its eastern side, and extends in this district from the Lakelse valley, south of Terrace, on the Grand Trunk Pacific Railway, north to the northerly boundary of the Province, a distance of about 450 miles.

As on the Western Contact, the essential rock formation is sedimentary, but differing in that the alteration is markedly less. F. E. and C. W. Wright say: "The character of the invaded sedimentaries east of the inland border of the granite is noticeably different. The slates and sandstones are less altered and typical schists are rare. Folding and particularly faulting are common and characteristic of the whole complex. The intruded rocks are often indurated (hardened) and heavily mineralized with sulphides near the contact and show evidence of metamorphism by the intrusives. The geologic interpretation of these data indicates clearly that the rocks east of the massifs were less deeply buried at the time of intrusion than those on the coastal side. In other words, the inland rocks were then above the zone of deep-seated metamorphism or rock-flowage, and were therefore profoundly affected by the invading intrusions and accompanying pneumatolytic solutions. Furthermore, the mineral-bearing solutions emanating from the granite encountered new conditions of temperature and pressure on entering the adjacent sedimentary rocks, and deposited, as supersaturated solutions in their new environment, a portion of their dissolved contents, especially metallic sulphides and silicates."

Quoting from McConnell: "The batholith is bordered on the east in this latitude (Portland Canal area) by two series of sedimentary, predominatingly argillaceous, beds, separated by a

* Summary Report, Dominion Department of Mines, 1912, page 63.

volcanic group made up of massive and fragmental greenstones. These formations are cut by numerous dykes and satelitic stocks belonging to the period of the Coast Range granitic invasion."

McConnell's observations with regard to the Portland Canal area apply equally as well to the Alice Arm, Kitsault River, and other sections of the Eastern Contact Belt and are probably typical throughout its whole length.

These dykes of igneous rocks, ranging from andesite to gabbro, are termed greenstones. They are both massive and schistose, highly altered, of a greenish colour, and generally impregnated with disseminated crystals of pyrite, weathering to a light yellowish colour. Silicified veins and shear-zones within these altered masses of greenstone are proving wonderfully rich carriers of native gold, native silver, and silver sulphides in the Kitsault River and Salmon River sections.

Geographically, the Eastern Contact Belt has not the natural advantage of accessibility such as the Coast and islands. Lying as it does east of the Alaska strip places it from fifty to one hundred miles from tide-water. The southern end is reached by the Grand Trunk Pacific at Terrace, ninety-five miles from Prince Rupert. North of this the Coast range is penetrated to the Eastern Contact Belt by the Nass river, Observatory inlet, and Portland canal, which are branches of Portland inlet, the Unuk river, Stikine river, and Taku inlet and river. The extreme northern portion of the belt is reached by way of Skagway; thence over the White Pass Railroad to Carcross, and from there by boat to Atlin.

Prospecting on the Eastern Contact Belt.

Exploration and development work on this zone are at present being carried on mainly at the head of Alice arm, up the Kitsault river, Illiance river, and at the head of Portland canal, up the Salmon and Bear River valleys. The results in these separate areas, which are about fifty miles apart, fully justify the opinion that, should other portions turn out equally as well, this belt will become one of the greatest mineral-producers on the continent.

Some little prospecting has been done in the Lakelse and Kitsumgallum valleys, and there should be good country around Kitsumgallum lake and beyond to the Nass river above Ayansh. This section is very accessible from Terrace, on the Grand Trunk Pacific, by wagon-road to Kitsumgallum lake, and from the lake following the telegraph-trail through to Ayansh, on the Nass river, the head of Indian mail-launch service from Mill bay. From Ayansh to Alice arm is reached by following the telegraph-line trail. There is an old trail from Ayansh up the Nass river to the foot of Meziadin lake, from which point there is a Government trail along the west side of the lake to the Bear-Nass trail from Stewart over the Bear River divide.

That portion of the belt at the head of Salmon river is reached by going over the Salmon River glacier beyond the *Forty-nine* group of mineral claims, or over the Long Lake glacier. (*See* Morkill's map of the Salmon River valley accompanying this report.)

The next point of access from the Coast is up the Unuk river from the nearest port of call of the Canadian Pacific Railway Coast steamers at Ketchikan. Several groups of claims were staked at the head of this river several years ago, were Crown-granted, and are still held by the original companies or individual owners. Some very fine samples of high-grade silver-gold ores, similar to those of the Salmon River valley, have been brought out of that section from time to time. (*See* Unuk River section in this report.)

Farther north the Stikine river and its main tributary from the south, the Iskut river, traverse the Eastern Contact Belt. The Stikine is navigable to Telegraph Creek, and an excellent service of river-boats is now handled by the Barrington Transportation Company from Wrangell. Navigation opens about May 15th, and a weekly service, meeting the Canadian Pacific Railway boats at Wrangell, is maintained throughout the summer. All that section of country from about seven miles above the boundary at the mouth of the Iskut river to the Clearwater river, flowing into the Stikine from the north, a distance of about sixty miles, should be as good prospecting country as is in the Province. The Clearwater river is navigable for small boats, by poling and lining, for probably thirty miles from its confluence with the Stikine, giving an additional area of fairly accessible country for prospecting. Also from the mouth of the Iskut river south for thirty or forty miles its course runs through this mineral-belt. It also is navigable for that distance by gas-boat or small boat by poling and lining.

With the exception of a few claims staked along the Stikine river and a group of claims up the Iskut, about thirty-six miles from its mouth, this whole length of nearly a hundred miles within the Eastern Contact Belt has never been prospected. There is room in this one section for hundreds of prospectors, and I believe the possibilities are the best in the Province.

A prospector's trail from the mouth of the South fork of the Iskut, following this branch for ten miles south to the head of the Unuk river, and a similar trail from the Bear-Nass trail, or from the head of Salmon river, north to the head of the Unuk, and connecting with the above-mentioned trail, would be an excellent start and of inestimable aid to prospectors toward opening up that very promising section of country.

Still farther north the belt is again cut by the Taku river, which flows into Taku arm. The river is navigable from its mouth to the Inklin river, flowing in from the south, for gas-boats. There is a trail through to Atlin from the mouth of the Sloko river. I have no information as to any prospecting or mineral finds in that section, but the river undoubtedly cuts through the mineralized belt. There is gas-boat service from Juneau to the head of Taku arm, and no doubt through to the Inklin river if desired.

The Mining Situation.

The year 1919 has, I think, been the decisive year for mining in the north-western portion of the Province. In 1910 and the two following years there was a considerable boom in the Bear River section, at the head of Portland canal. At that time it was an entirely new country, which probably accounts for the rush and excitement. The properties under exploration at that time failed to come up to expectations, and as a result the country was not only practically abandoned, but was "knocked" for several years by every one who had lost money in taking chances in schemes, mining and otherwise, that never had a chance of making good. It therefore augurs well for the future when this section has again claimed the attention of the mining world, strictly on the merits of the properties. These have been in the majority of cases thoroughly investigated by competent mining engineers.

The bonding of a number of properties in the Salmon River section early this spring, subsequent to the remarkable development of the Premier Gold Mining Company's property, resulted in a season of extraordinary activity and exploratory work. This work has shown satisfactory results, warranting further extensive development, and resulting in the bonding of many more meritorious prospects, on which work will be started as early in the spring as conditions will permit, indicating years of increasing activity and, no doubt, the development of not a few of these into shipping properties.

A parallel case is that of the Kitsault River section, where the phenomenal success of the Taylor Engineering Company, formerly the Dolly Varden Mines, has been the incentive for the exploration of many other favourable-looking showings in that section.

Undoubtedly this activity will gradually extend to other sections of the district as prospects of merit are developed to the stage where they can command the attention of the mining engineer.

The success of this year's hydraulic operations in the Dease Lake section has also attracted the attention of many, and I look for a keen interest being taken in that part of the district next season. (*See* Dease Lake section in this report.)

This revival of interest in mining has had a stimulating effect on prospecting, and the known mineral areas will gradually be extended as new prospects are discovered and explored. It should be the policy of the Government to liberally assist in every way the endeavours of the prospector to explore new country and to further any scheme whereby new men can be trained for such work.

The Government has built several miles of new trails throughout the district this year and repaired and improved many miles of old ones. The assistance rendered to prospectors for trails, etc., under the "Mineral Survey and Development Act." by the Mines Department is having a beneficial effect toward encouraging prospecting in outlying sections.

The following is a list of the shipping properties and their outputs for the year in this district:—

PRODUCTION FOR 1919 FROM DISTRICT NO. 1.

Name of Property.	Location.	Ore Mined.	Gold.	Silver.	Copper.
		Tons.	Oz.	Oz.	Lb.
Atlin (placers)	Atlin	.....	9,700	.....	.....
Stikine and Liard (placers)	Telegraph Creek				
Shuttle island (placers)	Lockeport				
Granby Consolidated Mining, Smelting, and Power Co.	Anyox	647,466	4,864	348,408	19,544,588
Taylor Engineering Co. (Dolly Varden)	Alice arm	6,709	.....	423,952	.....
La Rose mine	Alice arm	22	3	6,157	.....
Premier Gold Mining Co., Ltd.	Stewart	488	3,209	108,285	.....
Ikeda Mines, Ltd.	Ikeda bay	151	51	722	38,990
Shuttle island	Lockeport	50	18	.....	.....
Patterson group	Porcher island	10	37	18	.....
Alice Arm Silver Mining Co., Ltd.	Alice arm	27	.....	968	.....
Belmont-Surf Inlet Mines, Ltd.	Surf Inlet	102,716	51,684	30,319	810,388
Drum Lummon Mines, Ltd.	Hartley bay	18	10	353	17,455
Golkeish mine	Alice arm	1,200	200	1,231	.....
Totals		758,857	69,776	920,413	20,411,421

From the above it will be seen that the year's aggregate mineral production will fall short of last year's, due to the lessened output of the Granby Consolidated Mining, Smelting, and Power Company at Anyox. Their deficit was the direct result of a complete close-down for a couple of months early in the year and subsequent curtailed operations.

This reduction of total output cannot by any means be taken as an indication that the mining industry is depreciating. If the production of the Granby Company had been normal, the year's increase would have been the increase in output of the Belmont-Surf Inlet Mines and the outputs of the Premier Gold Mining Company and Taylor Engineering Company, amounting to approximately $750,000. As it is, the gold and silver outputs show an increase over last year, the latter being more than doubled, due to the shipments from the *Dolly Varden* at Alice arm and the *Premier* at Stewart.

The development of two such bonanza properties to the shipping stage and the advancement of several others to the stage that their future is assured, and the general encouraging mining outlook, are of far more significance to the mining industry than the temporary deficit in production of one property.

BELLA COOLA MINING DIVISION.

There have been a number of claims staked to the north of the Dean river at Tesla lake and assessment-work done on the older claims. These claims at Tesla lake are probably in the Omineca Mining Division.

Owing to lack of time I was unable to get over any portion of this Division this year, and have no information as to what work has been done during the year on the magnetite-iron showings on Seymour and other inlets and King island.

The Coast portion of this Division is very accessible for prospecting and can be reached by small boat from Hardy Bay or Alert Bay, or from Bella Bella, Ocean Falls, and Bella Coola, ports of call for Coast boats.

QUEEN CHARLOTTE MINING DIVISION.*

I visited the islands early in the spring, and regret that I have not been able to get over again to check up the season's work; however, from authentic information I am able to report properties and conditions to date.

There has been an encouraging increase in mining activities during the past season and claim-owners are very optimistic for next year.

There is an immense tonnage of straight magnetite ores exposed on the different islands, and therefore ideally located for mining and transportation. These would become of importance should the iron-manufacturing industry ever develop beyond the newspaper stage.

Nothing has been done this year with the beach sands on the east and north coasts of Graham island.

Some interest is again being taken in oil lands and about thirty locations have been made, extending from the north end of the Indian reserve, about a mile and a half above Skidegate, for twelve or thirteen miles up the east coast, about five miles north of Lawn Hill. All this

* Minister of Mines' Report, 1918.

area has been staked and applied for by W. A. Lewthwaite and Andrew Wright, of Victoria, representing English capital. They have made a trip of investigation to their holdings, accompanied by their engineer, Henry Jory, and claim that arrangements are complete for the immediate boring of this ground and that at least $150,000 will be expended in such work. This is a very praiseworthy enterprise and its success would be of inestimable benefit, not only to this district, but to the Province and Canada.

A few oil locations have also been made on the west coast, but no new developments with regard to further drilling.

Several mineral claims were staked around Kootenay harbour, on the west coast, and high-grade samples reported.

South Easter Mining Co.

This is a subsidiary company of the Northern Customs Concentrators, Limited, of Cobalt, Ontario. The holdings, consisting of seven claims, are situated about a mile from the beach at Skidegate. Operations were closed down early in the year and as yet have not been resumed. I am informed that the company is being reorganized and will proceed with the further development of the property. The company has a very serviceable little plant and has done, during the past two years, considerable exploratory work in sinking and drifting on the vein. There is a good surface showing of milling-grade gold ore, but the work so far has shown that this ore-shoot only extends down about 50 feet below the surface. Below this the vein is badly shattered and displaced. Deeper development by diamond-drilling was under consideration before closing down. A description of the workings was given in the Minister of Mines' Report, 1918, and very little has been done since.

Producer Group.

This property, formerly the *Lucky Seven*, is situated just outside of Jedway harbour and owned by Ike Thompson and Wilson McKinnon. It was bonded by Seattle interests more than a year ago and has been under development continuously since that time. A small water-driven compressor plant was installed for this preliminary work. Considerable development had been done by way of open-cutting and stripping, a shaft sunk 50 feet on the vein, and a drift on the vein for 60 feet south from the bottom of the shaft. This year's work consisted of driving a cross-cut tunnel from near the beach to cut the vein under the shaft. It was run about 375 feet and some difficulty was had in locating the vein. Crosscuts were therefore run both ways from the end of the tunnel and a raise finally put through to the old drift at the bottom of the shaft. Work has now been resumed in this shaft, drift following about 2 feet of ore on the hanging-wall. The vein shows about 12 feet more of fair-looking milling ore.

A tramway has been installed from the mine to the beach, with a bunker of 25 tons capacity at the mine and one of 350 tons capacity at the beach.

This gives promise of becoming a valuable property, and the bondors deserve credit for the perseverance they have shown under rather discouraging conditions.

Ikeda Mines, Ltd.

Very little development-work has been done on this property since reported on last year. It has been operated in a small way all year under the management of A. Ikeda, and shipped 151 tons of copper ore to the Granby smelter at Anyox, yielding 51 oz. gold, 722 oz. silver, and 38,990 lb. copper. The gold and silver content is about the same as last year, but the copper has fallen off 20,000 lb.

Mr. Ikeda made a trip to Japan, returning with mining engineers, who made a thorough examination of the property and returned to Japan. The property has been a persistent shipper for a number of years, but it is evident that it now requires a concentrating plant and extensive development if its production is to be maintained. It is to be hoped that Mr. Ikeda will be successful in his efforts to secure the necessary capital to develop and equip the property, which the exposed milling-ore in the present workings and the numerous surface showings would seem to justify.

Copper Island.

This is situated just at the entrance to Jedway harbour and contains three claims—*Golden Gate*, *Trust*, and *Skincuttle Entrance*—belonging to A. Heino. The owner has done a lot of work on his claims and for several years has shipped a few tons of good-grade copper ore each year.

There is a broad belt of hornblende, about 1,400 feet long, that shows, wherever broken into, chalcopyrite in disseminated grains and bunches across a width of from 20 to 30 feet. A tunnel has been driven about 150 feet in a silicified limestone that appears to lie on the foot-wall of

the hornblende-belt and which is also mineralized with chalcopyrite. It is reported that the whole face of this tunnel is now in good ore.

The island is low, about 200 feet being the greatest depth obtainable without sinking, well timbered, and probably sufficient water could be developed for milling purposes. This is a rather promising-looking property.

Burnaby Island. The two claims, *Mother Lode* and the *Bank of Commerce*, are owned by Campbell & Wilds. I did not examine the property this year, but I am informed that a shaft has been sunk to a depth of 35 feet and some good chalcopyrite ore exposed.

Copper Queen Group. This group, owned by J. S. McMillan, is situated above Jedway harbour. The last work done on the property was in 1908, when a tunnel some 220 feet in length was driven and a few hundred feet of diamond-drilling done. One man has been employed during this summer prospecting the surface. The ore is magnetite carrying pyrite and chalcopyrite.

The numerous iron-deposits, of magnetite, in this Division were investigated to some extent during the summer.

Shuttle Island. This is a small island situated about seven miles below Lockeport. On the *Ellen* claim the owners have been working all summer. A crosscut tunnel had been run 65 feet to cut a quartz vein showing on the surface, in which native gold was found in spots. The vein was encountered showing a width of about 8 inches. The greatest depth obtainable without sinking would only be about 25 or 30 feet. They took out $350 in gold by mortaring and panning. There are small irregular quartz veins occurring in sedimentary formation and these may prove profitable in a small way.

The placer claim *Ticksey* takes in all the gravel beach exposed. This also has been worked this summer by the owner, J. Hendricks. The beach-gravel was shovelled on a scow and hauled to the main island, about half a mile away, where a small creek was utilized for washing it to obtain the gold. About 54 oz. of placer gold was sent to the Dominion Government Assay Office, Vancouver, and the owner has also probably $300 or $400 in nuggets.

The gold is the result of the disintegration of the small quartz-seams, but the length of beach and the limited amount of gravel precludes the possibility of the diggings becoming of any great importance.

SKEENA MINING DIVISION.

This Division takes in about 200 miles in length of the Coast range and coast-line to the mouth of Portland inlet, and includes a small strip of the Eastern Contact Belt from the Grand Trunk Pacific north to the southern boundary of the Nass River Division. The outer islands are in the Western Contact Belt. The main area is the granite Coast range, which is traversed by many waterways, of which the most extensive is Douglas channel, with its arms—Gardner canal, Kildala arm, and Kitimat arm—which penetrate almost to the Eastern Contact Belt. The head of Gardner canal is within thirty or forty miles of the mineral area of the Sibola section of the Omineca Mining Division, on the eastern side of the range, and may possibly eventually become the main outlet for that interior country.

There are many ports of call south of Prince Rupert from which any part of the Coast or Coast islands can be reached for prospecting. Prince Rupert, the western terminus of the Grand Trunk Pacific, is the main distributing centre for the Queen Charlotte islands, the interior, and up and down the Coast.

For convenience the Skeena Mining Division will be subdivided as follows: Coast section; Grand Trunk Pacific Railroad section; Kitsumgallum Valley section; Lakelse Valley (Thornhill Mountain) section.

COAST SECTION.

This includes all the Coast islands and any part of the mainland reached from tide-water.

Belmont-Surf Inlet Mines, Ltd.* This is a subsidiary company of the Tonopah Belmont Development Company. The holdings, consisting of nine mineral claims, were originally the *D.L.S.* group, owned by the Surf Inlet Mines, Limited, who optioned them to the Belmont Canadian Mines, Limited, retaining 20 per cent. The Belmont Canadian Mines, Limited, developed the property, bought the 80-per-cent. interest, and reorganized

* *See* Minister of Mines' Report, 1917, 1918.

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Divide
DIVIDE LAKE
DILWORTH GLACIER
Yellowstone
Silver Crest
Spider
Mountain Boy
Northern Terminus
Mt. JOHNSTONE
Montana Sunset
Silver Tip
Unicorn
Hercules
LONG LAKE
Big Missouri
Mineral Hill
Monitor
SILVER LAKE
Daly & Sullivan
No Name lake
SLATE MT.
Mother lode
Pay Roll
Boundary
Indian
Cobalt
Bush Mines Ltd.
Mist
Northern Light
B.C. Silver Mines
INDIAN LAKE
Wood bine
Premier
International
ELEVEN-MILE (Road House)
New Alaska (President Silver M.)
NINE-MILE
Red Cliff
Mosquito cr.
Rufus
Comet
Red Top
Vatron
McIntominy
Cabin and Tent
Grey Copper
George
Bear River Glacier
Divide
Strohn cr.
MEZIADIN LAKE
Mt. GLADSTONE
BEAR LL.
St. Elmo
Julland Cabin
Unexplored
Nelson
Porter
porter cr.
Willoughby cr.
Hayflower
Nabob
Lakeview
Rob Francis
Prince John
Sunshine
Portland Canal M.C.
Evening Sun
Columbia
Bon Bolt
Gibson
Bayview
Fish cr.
STEWART
Molly B.
Tide Flats
HYDER
North Fork Basin
Fraser
MARMOT BAY
Montana
river
Unexplored
Hanly
Old Chum
Cambria Mine
Cambria Valley
Portland Canal
Key Map
Scale of Miles.
STIKINE MINING DIVISION
Echo Lake cabin
Iskut
Nass River
PORTLAND CANAL MINING DIVISION
Wrangell
Burroughs Bay
Hyder
Stewart

B.C. Bureau of Mines

into the present company. The mine and plant were fully described in the Minister of Mines' Report, 1917, since which time the mine has been steadily developed and ore-exposures kept well ahead of production.

During 1919, 5,544 feet of underground development-work was done, consisting of 2,147 feet of raising, 2,250 feet of drifting, 1,017 feet of crosscut, and 121.5 feet of shaft-sinking, distributed over all the mine levels. The above work includes the new 800-foot level which has been opened up from the shaft by drifting north and south on the west vein, and which has opened up an appreciable tonnage of ore. The vein below the 700-foot level has straightened up considerably.

Both mine and mill operated continuously throughout the year, with the exception of about thirty days, when labour was extremely scarce. There were milled 103,927 dry tons of ore, of which 102,716 was stoped and 1,211 tons reclaimed from the dumps. From this, 9,515 tons of concentrates was produced, yielding a gross value of $1,183,012.87 in metal content, as follows: 51,684 oz. gold, 30,319 oz. silver, and 810,388 lb. copper, an increase over last year's production of 10,066 oz. gold, 2,983 oz. silver, and 378,075 lb. copper. These returns indicate an increase of over $1 a ton in average gold values and an increase of about 0.12 per cent. in average copper content of the mine-run ore. The silver remained about the same as last year. The concentrates were shipped to Tacoma, Wash., for treatment.

The *Pugsley* mine, adjoining the claims of the Belmont-Surf Inlet Mines, Limited, is owned by that company. Development-work has been continued throughout the year with a small crew in the lower tunnel. Additional ore was exposed in both the east and west veins.

The staff at the mine consists of F. W. Holler, superintendent; E. W. Hawkins, auditor; F. H. Penn, mill superintendent; and C. P. Seale, mine superintendent.

Whale Channel Mines, Ltd.

This company is being incorporated, with head office in Vancouver, for $200,000 in 200,000 shares, to take over the *Moose* group, consisting of the *Moose*, *Moose 2*, and *Moose 3* mineral claims, situated four miles south of River bight, on Princess Royal island. This group was located this summer. I have no information with regard to the mineral-showings, etc., on it.

Drum Lummon Mines, Ltd.

This company has its registered office at 1115 Dominion Building, Vancouver. W. Porteous Sloan is manager of the company. The property is situated on Drum Lummon bay (Miskatlah bay), on the north shore of Douglas channel, about twenty-five miles from Hartley Bay, the nearest port of call for Coast-plying steamers, from which it is reached by launch. There is a good floating dock at the property used by Coast freight-boats. The company's holdings consist of fifteen Crown-granted claims.

The year's work consists of the continuation of the main drift for about 50 feet, making a total of nearly 400 feet, and drifting on a cross-vein for 25 feet. Also some stoping was done in two places, supplying feed for the mill, which produced 18 tons of high-grade copper ore. The concentrates were shipped to Tacoma and yielded 10 oz. gold, 353 oz. silver, and 17,455 lb. copper. A rough estimate of the amount of feed, compared with the concentrates produced, gives an approximate ratio of concentration of 20 into 1. It is probably possible to stope-sort the ore to a better feed grade than this.

The ore occurs as bornite, chalcocite, and chalcopyrite in biotite, quartz, or feldspar replacement products following a light-grey acidic dyke. The vein-filling appears to be a segregation of the granite constituents into separate masses, as there are big bodies of pure quartz, orthoclase feldspar, and, bordering either of the above, biotite, the whole suggesting a very coarse pegmatite. The metallic minerals may occur as disseminated grains around the borders of and in the quartz and feldspar, or bunches enclosed in either, but the main mineralization appears to be associated with the biotite, lying in small bunches or interlaminated in it. This mineralized border varies in width from an inch to 2 feet, and under present milling conditions is mined as clean as possible for mill-feed.

The ore is so erratic in occurrence that it is impossible to make any estimate of probable tonnage, and a great amount of development-work will therefore be necessary to put any definite amount of ore in sight. However, with a small, well-located, and suitably designed mill on the property, it would go far toward paying for the extensive development required to prove the worth of the property.

The present mill has been remodelled from the one built last year, the Gibson-type table having been replaced by three small jigs—a bull-jig and two finer ones—and a K. & K. flotation-

machine added. The two fine jigs make a clean, high-grade concentrate and an appreciable amount of gold is found on the screens, for the recovery of which provision will have to be made. Grinding is done with two Gibson mills, taking their feed direct from the crusher, but their capacity is inadequate and product unsuited for the present milling process.

A new camp has been built at the mine, consisting of a 16- x 24-foot bunk-house and a 16- x 18-foot cook-house under one roof with a shed between. This will eliminate the mile walk from the beach for the men. Mr. Copp is in charge of the work at the property.

Ecstall River. The pyrite-showings twenty-five miles up the Ecstall from its mouth are yet under option to the Granby Consolidated Company, of Anyox. Diamond-drilling was continued all summer, but no information is at hand as to the results obtained.

Porcher Island.

McTavish Claims. These are the *Mayday*, *Billie*, *Ida*, and *Jessie*, belonging to Neil McTavish and partners, Prince Rupert. The claims are situated on the North arm of Kitkatla inlet. The mineralization on the claims is pyrite contained in what appears to be a contact-belt of gneissoid granite, hornblende, and mica-schists. No work has been done yet, but the claims deserve a little exploration for copper values. They were staked last year.

Patterson Group. This group consists of the *Trixie*, *Jeanie*, and *Western Hope*, situated about three-quarters of a mile from the beach at Surf point, where there is a good harbour. The claims are owned by Frank Patterson, who this year mined, sorted, and shipped 10 tons of ore to Trail that gave returns of 3.76 oz. gold and 1.8 oz. silver to the ton, or a total of $770.

The ore is a pyritized quartz, occurring in the solid granite country-rock, carrying nothing but pyrites, which contains the gold and silver values and is therefore an ideal concentrating-ore. The shipped ore assayed 40 per cent. insoluble or a concentrating ratio of nearly 2 into 1, so that the ore as broken would probably concentrate from 10 to 15 into 1.

On the *Trixie* claim a tunnel at an elevation of 400 feet has been driven 60 feet on a quartz vein, striking N. 70° E. and dipping slightly north, that widens in places to 3 feet. It was from this tunnel that the shipped ore was sorted. The pyrite apparently carries all the values, and as it occurs more or less in bunches it is difficult to estimate tonnage or average values. Higher up on the same claim, at an elevation of 450 feet, an open-cut about 20 feet high at the face has been driven across to another parallel vein that shows a width of 3 feet in places and pinches to a few inches. This is the highest showing exposed. A little lower than this cut considerable stripping has been done on a parallel vein, exposing it for a length of 300 feet and showing it to vary from a foot to 2 feet in width. The quartz in this vein is well and evenly pyritized and is the best showing on the property. Farther east, on the *Western Hope* claim, a crosscut tunnel was driven to undercut this surface showing. The tunnel is in 60 feet and at 42 feet from the portal encountered a barren quartz vein which was drifted on for 45 feet. This vein appears on the surface about 15 feet from the vein mentioned as being exposed for 300 feet. The face of the tunnel now shows bunches of pyritized quartz and should be extended a short distance farther to make sure that the vein has been crossed. Further development might expose sufficient ore to warrant a small mill. A crusher, ball-mill, and a flotation unit would be about all the plant required to make a perfect recovery of the iron sulphide.

Eagle. This claim, belonging to Joe Dawson, lies west of and adjoining the *Trixie* claim of the *Patterson* group. At an elevation of 125 feet a tunnel has been driven for 12 feet from the end of an open-cut about 12 feet long on a scattered mineralization of pyritized quartz lying in a diorite-belt. The vein or mineralization strikes N. 70° E., the same as the showings on the *Trixie* claim. There are about 50 tons on the dump from this work, a grab sample of which gave returns of 1.88 oz. gold and 3 oz. silver to the ton, with a trace of copper. At the face of the tunnel the ore is cut off by a cross-fracture which was followed for 24 feet without picking up the continuation of the ore. Bunches of good-looking ore up to 2 feet in width make this a fair showing, and it is well worth further work to try to locate the continuation of the ore beyond the fault-fracture.

With sufficient ore to justify a small mill, the location of this property, practically on tide-water, would make it an ideal little proposition.

International Copper Co.

A full report of this property was given by the Gold Commissioner in the Minister of Mines' Report, 1916, page 50, under the name of *Bald Mountain* group. At the time of my trip this summer some surface work was being done and a short tunnel was being continued for the yearly assessment-work. Nothing new has been reported.

Mammoth Group.—This group is owned by Martin O'Reilly, of Prince Rupert, and associates, and described in the Minister of Mines' Report, 1917. Assessment-work has been recorded to 1921. No work was done this year.

Gibson Island.

Standard Group.—This group is owned by Frank St. Amour, of Prince Rupert, and partners. Only the yearly assessment-work has been done.

Some small showings of high-grade chalcopyrite have been reported on Banks, Kennedy, Henry, and other islands, but nothing of importance has as yet been uncovered.

Grand Trunk Pacific Railway Section.

There has been practically no activity in mining, other than yearly assessments, along the railroad this year.

Kitsumgallum Valley Section.

This valley probably marks the immediate eastern contact of the Coast range with the interior sedimentaries, and as such presents a good field for prospecting. Its accessibility is a favourable feature for the mine operator. There is a wagon-road extending the length of the valley for 16½ miles from Terrace, on the Grand Trunk Pacific, to the foot of Kitsumgallum lake. Portions of the road, especially the two or three miles next to the lake, are not in very good repair, but in the event of mining activity it could be readily made into a first-class road suitable for motor-haulage.

The hills on either side of the valley have not been prospected to any extent. The telegraph-trail extends from the end of the wagon-road, following the east side of the lake to its head, a distance of six miles, and from there up the valley for another ten miles to the Cedar River Crossing. From the crossing it continues through to Ayansh, on the Nass river, a further distance of twenty miles; thence by way of Alice Arm to Anyox. This trail follows the Eastern Contact Belt all the way through and affords an excellent means of getting into the country to prospect. Pack-horses can be taken all the way from Terrace to Ayansh, which point may also be reached by boat from the Coast up the Nass river. There is an excellent prospecting country from Terrace to the lake and surrounding the lake, the latter accessible by way of numerous creeks and rivers flowing into it.

A number of claims have been staked on the surrounding hills and considerable work done in assessments. I was unable to get into this section this year, but examined several properties the year before, described in Minister of Mines' Report, 1918. The rock formation is sedimentary, altered and intruded by many dykes and granite-masses, and should be exceptionally favourable for the occurrence of minerals. Yearly assessment-work has been done on all the old prospects and several new locations have been made on Beaver river and the east side of the lake.

The owners of the *Blue Grouse* and *Hunter* groups, about six miles up the Cedar river from the crossing, have built a good trail about half-way to their property, up the east side of the river. They will be assisted by the Mines Department, for this trail will be of great benefit to that upper section of the valley. I have not seen the coal croppings on the west side of Cedar river, but judging from authentic reports, I believe them worth investigating. The owners of the *Bear* group and surrounding claims, at the head of Falls creek, at the north-east corner of the lake, are said to have exposed some good showings of high-grade silver ore. This is probably the extension of the Fiddler Creek veins.

On Maroon creek, flowing in about the centre of the lake on the east side, the owners of the *Copper* group did the assessment-work on their claims and built about a mile of trail from the lake up the creek.

Several claims near Terrace, along the railroad, are said to have favourable-looking showings.

LAKELSE VALLEY (THORNHILL MOUNTAIN) SECTION.

Only the yearly assessments have been done on claims in this section. There are no further developments with regard to the extensive limonite-deposits up the Zymoetz river. This section was reported on in Minister of Mines' Report, 1918.

NASS RIVER MINING DIVISION.

This Division was created in 1918, and includes the whole valley and drainage-basin of the Nass river to the headwaters of the Unuk, and Observatory inlet with its branches, Hastings arm and Alice arm. It therefore contains all that portion of the Eastern Contact Belt from the summit of the range between the Skeena and Nass rivers north, crossing at the head of Alice arm to the Unuk river, with the exception of a small area at the head of Portland canal.

Note by Provincial Mineralogist.—Since this report was written there has been a change in the boundaries of the Nass River Mining Division, to take effect on and after the 2nd day of July, 1920. The boundaries as now defined are as follows:—

"Commencing at Ramsden point separating the entrance to Portland canal from the entrance to Observatory inlet; thence northerly along the divide separating the drainage area of the said canal from the drainage area of the said inlet to Mount Brown; thence easterly along the divide separating the drainage area of the Kshwan, Kitzault, and Kinskuch rivers on the south from the drainage area of White river and Paw creek on the north to a crossing of the Nass river north of Cottonwood creek at the north-west corner of Lot 3402, Cassiar District; thence north-easterly along the divide separating the drainage area of Cottonwood creek on the south from the drainage area of Wolverine creek on the north to a point on the western boundary of Omineca Mining Division, east of the south end of Meziadin lake, approximately where the said western boundary of Omineca Mining Division is intersected by the 56th parallel; thence southerly and westerly along the divide separating the drainage area of the Skeena river on the east and south from the drainage area of the Nass river on the west and north; thence along the divide separating the drainage area of Kwinamass river on the north from the drainage area of the Khutzeymateen river on the south to a point on the Khutzeymateen inlet immediately south of Somerville island; thence across said inlet and westerly along the channel south of Somerville and Wales islands to the International Boundary; thence northerly following the said boundary to a point north of Pearse island, and thence south-easterly to the point of commencement at Ramsden point."

The Division is accessible by way of Portland inlet for Coast-plying boats, providing a bi-weekly service from Prince Rupert to Anyox and Alice Arm, and from Mill bay up the Nass river by gas-boat to Ayansh; also by way of Stewart, at the head of Portland canal, over the Bear River divide, Salmon River glacier, and Long Lake glacier. (*See* Portland Canal Mining Division.) From Alice Arm the Dolly Varden Railroad extends up the Kitsault River valley for eighteen miles, from which point there is a first-class pack-trail to the head of the river, a further distance of about eight miles. There are branch trails up the principal tributaries flowing into the Kitsault. There is also a good trail up the Illiance river for sixteen miles from Alice Arm.

From Ayansh (Indian village), on the Nass river, there is an old trail following the river through to Meziadin lake. There is also a trail from Kitwanga, on the Grand Trunk Pacific, up the Kitwanga river and down Cranberry creek, that hits the Nass river about sixty miles up from Ayansh.

The Division is subdivided as follows: Observatory Inlet section; Alice Arm section; Kitsault River section; Illiance River section; Unuk River section.

OBSERVATORY INLET SECTION.

This takes in the area from the mouth of Portland inlet to the head of Observatory inlet at Anyox, and is practically all in the Coast Range granite. The only property in this section is that of the Granby Consolidated Mining, Smelting, and Power Company. The company's smelting plant and mine at Anyox were unfortunately closed down for a couple of months early in the year for a readjustment of conditions subsequent to the signing of the Armistice. This close-down and the curtailed operations following it were a serious detriment to the year's output. There was smelted from the company's *Hidden Creek* mines 647,466 tons of ore, using 41,000 tons of limestone from Swamp point and 36,000 tons of quartz for fluxing, and 56,500 tons

of coke. The metallic output from the above tonnage mined was 4,864 oz. gold, 348,408 oz. silver, and 19,544,588 lb. copper, showing an increase in gold and silver due probably to values in the fluxing-quartz, but a deficit of about 9,700,000 lb. copper.

The company has employed an average of 1,350 men throughout the year and has expended about $2,350,000 in wages.

The most important feature of the year's operations was the completion of the by-product coke-ovens at the smelter. The following short sketch of that branch of the Anyox plant has been kindly furnished me by W. A. Williams, resident manager:—

"The Granby Consolidated Mining, Smelting, and Power Company, the largest producer of copper in British Columbia, consumes an average of 250 tons of coke a day. Bee-hive coke was formerly shipped in and these shipments were often considerably delayed, causing great inconvenience in operation of the smelter. To secure a more reliable supply the company decided to produce its own coke. A modern coal-mine was put in operation at Cassidy, a few miles from Nanaimo, on Vancouver island, and a coke plant was built at the smelter. The coal is screened at the mine, the marketable sizes sold, and the slack washed and shipped to coke plant.

"*Coal-handling.*—Barges holding about 2,000 tons, carry the washed slack to the coke plant, where it is unloaded by a steam-hoist operating a 1-ton hoisting-bucket and having an unloading capacity of 120 tons an hour. The hoisting-bucket empties the coal into a hopper, from which it is carried by a 30-inch belt to the top of the 12,000-ton storage-bin, where it is distributed by another belt running along the top of the bin. The storage-bin, built entirely of wood, is 300 feet long and 51 feet wide, with a V-shaped bottom. From the storage-bin the coal is taken by conveyor-belt and elevator to the crusher, which is of the swing-hammer type and has a rated capacity of 50 tons an hour. The coal is crushed so that at least 90 per cent. will go through a ¼-inch screen and 80 per cent. through a ⅛-inch. A bucket-conveyor takes the coal from the crusher to the 500-ton bunkers over the ovens. The coal is drawn from the bunkers into a lorry equipped with four cone-shaped hoppers, the combined capacity of which is 130 tons, just sufficient to charge one oven.

"*Ovens.*—The battery consists of thirty ovens (capacity of 24-hour coke is 270 tons) and was designed by the Gas and Coke Oven Corporation of America; the special feature being vertical flues instead of horizontal flues. The dimensions of the coking-chambers are 37 feet 4 inches long, 9 feet 10 inches high, 18 inches wide at the pusher side, and 21 inches wide at the coke side, with a capacity of approximately 13 tons. A regenerator is situated directly under each oven and is separated from the adjacent regenerators by a heavy wall, upon which the heating-wall rests. The heating-wall is made up of thirty vertical flues, each two adjacent flues forming a complete heating unit. Situated beneath these vertical flues are two gas-ducts which feed the gas to them through removable nozzles. These horizontal gas-ducts are so divided that fourteen of the vertical flues receive their gas from the coke side and sixteen from the pusher side. The regenerators are connected to waste-heat flues paralleling each side of the battery, and are so divided as to furnish air to and to receive the products of combustion from those flues, receiving gas from the same side.

"The regenerators are divided into an upper and lower section by means of a horizontal partition extending from the front of the regenerator-chamber to within 18 inches of the back wall. Thus any tendency of the combustion-air and products of combustion to short-circuit is avoided and their travel increased. The efficiency of the regenerator system is greatly augmented by having that regenerator-chamber, through which combustion-air is being drawn, sandwiched between two regenerators through which products of combustion are escaping, thus effecting what might be called a combined regenerative and recuperative system.

"*Battery Equipment.*—The pusher was built by the Atlas Industrial Car Company, of Cleveland, Ohio, and comprises door-extractor, pushing-ram, and levelling-bar. The coke-guide and door-extractor on the coke side are hung from an overhead track. The quencher-car, also built by the Atlas Company, is provided with air-operated side-dumping doors. When the quencher-car with its load of red-hot coke reaches the quenching-station the water is automatically turned on, and is likewise automatically turned off when the car leaves the station. After quenching, the coke is taken directly to the screening-station, where it is separated into furnace and breeze coke and loaded directly into cars. The coke-handling is greatly facilitated by the fact that owing to difference in elevation of quencher and loading tracks the cars are loaded by gravity.

"The gas is reversed each half-hour, burning in one flue of each unit for one half-hour and in the other flue the next half-hour. Thus we have combustion taking place in every alternate flue the whole length of the oven-wall. The size of the opening connecting the two flues comprising a unit is regulated by a slide-brick, thus controlling the air-supply to that particular unit. Above each flue is an inspection-hole, through which the condition and temperature of the wall may be determined. The openings leading from the regenerator to the stack-flues are provided with dampers, so that the draught to each regenerator may be regulated. The incoming combustion-air is regulated by the use of finger-bars. There is a damper in each stack-flue just before they unite into a single flue at the stack end of the battery. This single flue, which leads to the stack, also contains a damper. The stack is built of radial brick, is 177 feet high, and 9 feet 8 inches in diameter at bottom and 7 feet at the top.

"The gas is conducted from the oven-chamber through 14-inch cast-iron ascension pipes to the collecting-main, which is 4 feet 4 inches wide and 4 feet 9 inches deep at one end and 5 feet 8 inches deep at the other, with a semicircular bottom. The offtake-main is 28 inches in diameter and continues to just beyond the bunkers, where it enters the downtake, which is 24 inches in diameter, and thence along the ground to the by-product building. A hand-valve to control pressure in the collecting-main is located just before the downtake. The temperature of the gas is considerably reduced in the collecting-main and the heavier particles of tar and liquor condense and escape as a liquid. To keep the main free from thick tar and pitch, fresh tar is continuously circulated through it. This flushing-tar drains off through a sealed overflow so arranged that any solid deposited may be raked out and removed.

"On reaching the by-products building the gas enters the primary coolers, of which there are three, each containing 594 3-inch outside diameter, lap-welded steel tubes 17 feet long. The water flows through the tubes and the gas around them. The temperature of the gas is here reduced to 32° C. and most of the tar and liquor is deposited. The gas now enters the exhauster, whose function it is to maintain an even pressure in the collecting-main and to force the gas through the remaining apparatus.

"The exhausters, three in number, were built by the Connersville Blower Company, and are driven by 10- x 10-inch vertical self-oiling Troy steam-engines, and are equipped with Huntoon float-governors, arranged so as to maintain a pressure of 1-2 mm. in the collecting-main. The exhausters have a displacement of 17 cubic feet a revolution and are designed to operate at 250 r.p.m. against a total plus and minus pressure of 2½ lb. a square inch.

"After leaving the primary coolers the gas still holds tar in suspension in the form of minute globules called 'tar-fog.' The removal of these last traces is accomplished by means of a P. & A. tar-extractor, which consists of a series of perforated steel plates so arranged that the gas passing through the first plate will impinge upon the unperforated part of the second plate. The impact causes the very fine particles to coalesce and run down the plate.

"*Sulphate-recovery.*—From the extractors the tar-free gas goes to the saturators, which are large lead-lined cast-iron containers, where it is caused to pass through a bath containing 5 to 7 per cent. of sulphuric acid. The ammonia in the gas reacts with the acid to form a white crystalline salt, ammonium sulphate, which settles to the bottom of the saturator and is removed to the drain-table by means of an air-ejector. From the drain-table the salt is conducted to a centrifugal dryer, where it is washed with water, to remove the free acid, and dried.

"The liquor and tar which have condensed out in the various parts of the process are pumped to a separating-tank of 45,000 gallons capacity, where the tar and liquor separate, due to their difference in specific gravity. The liquor overflows into a 50,000-gallon liquor-storage tank and the tar is drawn off from the bottom to the 200,000-gallon tar-storage tank. The tar produced averages eight imperial gallons to the ton of coal. The liquor, which contains one-fifth of the total ammonia produced, is treated in a continuous still, where the ammonia vapours are liberated. These vapours are also passed through the saturator, which is so constructed that the waste gases which accompany the ammonia vapours from the still may pass into the main gas-stream leaving the saturator, or be conducted to the atmosphere.

"The free leg of the ammonia-still is made up of three 21-inch cast-iron sections and one 15-inch section, all resting upon the liming-chamber, which is 6 feet high. The internal diameter of all sections is 4 feet 3 inches and the total height of the free leg is 15 feet. The fixed leg is made up of two 21-inch sections and one 15-inch section of the same diameter as those comprising the free leg. Each section is provided with a vapour-passage through the bottom covered with

a hood with serrated edges and an internal overflow for liquor passing to the next lower section. Each section is provided with hand-holes by means of which access can be had to every part of the interior, so that the apparatus may be readily inspected and cleaned. The liquor enters the top of the still and drops from section to section; the steam which enters at the bottom, as well as any liberated vapours, pass up through the vapour-passages and bubble through the liquor at the edge of the hood. The boiling liquor from which the free ammonia has been expelled is mixed with milk of lime in the liming-chamber and caused to flow into the fixed leg, where the remaining ammonia is liberated. The escaping liquor contains 0.003 to 0.007 per cent. ammonia.

"The saturator is provided with a mother liquor-heater which may be used to maintain the temperature of the bath in case the still is not running, or to heat up the bath when starting a saturator. Under normal working conditions the heat from the ammonia vapours from the still and the heat of dilution of the sulphuric acid are sufficient to maintain a temperature of 45 to 50° C. The salt produced averages more than 20 lb. a ton and contains at least 25 per cent. ammonia and less than 0.2 free acid.

"*Final Coolers.*—From the saturators the gas passes into the final coolers, which are 40 feet high and 10 feet in diameter and are of the direct-contact type. The water not only cools the gas, but mechanically washes out a large portion of the naphthalene.

"*Light-oil Scrubber.*—To recover the light oils the gas is scrubbed with straw-oil, a petroleum product, in a hurdle washer 75 feet high and 14 feet in diameter. The slats composing the hurdles are 5 inches wide, ¾ inch thick, and spaced ¾ inch apart; thus the gas in passing through the scrubber flows in thin streams over surfaces which are continually wet with the absorbent. The travel of the gas and oil is counter-current. The oil is pumped to the top of the scrubber and flows zigzag down over the hurdles, while the gas enters at the bottom and leaves at the top; thus the partially debenzolized oil is brought in contact with the fresh wash-oil, which is able to more efficiently remove the small amount of light oil yet remaining, and likewise the partially benzolized oil is brought in contact with the rich gas and its light contact oil increased. The amount of wash-oil circulated depends upon the number of cubic feet of gas produced and its light-oil content, and is of such an amount as to keep the light-oil content of the benzolized wash-oil between 2 and 3 per cent. The benzolized oil is stored in a 3,000-gallon tank, from which it is pumped to the stripping-still.

"*Heat Exchangers.*—The debenzolized oil leaves the still at about 130° C., and before it is recirculated its temperature is reduced by a system of heat exchangers and coolers to about 20° C. The debenzolized wash-oil leaving the bottom of the still and the light-oil vapours leaving the top of the still contain considerable amounts of heat which is transferred to the incoming benzolized oil. The benzolized wash-oil is pumped from the storage-tank to the vapour-oil heat exchanger, which consists of a cylindrical steel shell containing a number of tubes. The cold debenzolized wash-oil flows through the tubes, while the hot light-oil vapours from the top of the still pass around the tube. There are two vapour-oil heat exchangers so connected that one can be by-passed without interfering with the operation of the other.

"From the vapour-oil exchanger the partially heated benzolized oil enters the oil to oil heat exchanger, where its temperature is increased by the debenzolized oil leaving the still. After leaving the oil to oil heat exchanger the benzolized wash-oil enters a superheater, where its temperature is raised to 140-150° C. This superheater was furnished by the Alberger Heater Company, of Buffalo, New York, and is 8 feet long and about 20 inches diameter.

"*Stripping-still.*—The hot benzolized oil now enters a stripping-still which is continuous in its operation. The still is made up of seventeen sections, each section being 12 feet ⅜ inch in height and 4 feet 4 inches inside diameter. The hot oil enters the eighth section from the bottom and passes down the still rapidly, giving up the light oil it contains. Steam is admitted in the bottom section and passes up through the still, bubbling under the sealing-bells of each tray and carrying upward the light oil in the form of vapour.

"As noted before, the debenzolized oil, on leaving the still, passes through the oil to oil exchanger, where it gives up some of its heat to the incoming benzolized oil, then to the wash-oil coolers. There are two wash-oil coolers, a tank cooler containing eighteen 2½-inch steel pipes 22 feet long and a spray cooler consisting of sixty 2-inch steel pipes 19 feet long. From the cooler the oil goes to the debenzolized-oil tank and is ready for recirculation.

"*Fractionating and Purifying Stills.*—From the 23,000-gallon light-oil storage-tank the light oil is pumped into the crude-still, which consists of a horizontal cylindrical kettle holding 3,800

gallons and a fractionating column of fourteen sections resting on a separate foundation. Heat is supplied by means of indirect steam through sixteen 1½-inch extra-heavy pipes 13 feet 10 inches long placed in the bottom of the kettle so that direct steam may be used when desired. The presence of live steam lowers the boiling-point and is necessary when the toluol and solvent fractions are reached.

The operation of the raw-still depends upon whether motor-fuel or pure products are to be produced. The first portion to distill over is often discarded because of the carbon bisulphide it contains. When making pure products the crude distillate is divided into 90 benzol, 90 toluol, and solvent naphtha. There will always be a residue left in the kettle consisting of wash-oil, naphthalene, etc.

"These crude products are then transferred to a lead-lined agitator, where they are washed with sulphuric acid for about thirty minutes, after which another thirty minutes is allowed for the used acid to settle. The acid is used to separate the unsaturated hydrocarbons, principally olefines. After the sludge is run off the benzol or toluol is washed with water and any acid remaining neutralized with caustic soda.

"The washed products are now ready for rectification in the pure-still. The pure-still is similar to the crude-still in construction, but greater care and skill is required in its operation. Each 1,000 gallons of light oil will produce about 500 gallons C.P. benzol, 100 gallons C.P. toluol, and 100 gallons refined solvent naphtha.

"When making motor-fuel, the benzol, toluol, and such higher portions as will give a finished product which will distill to complete dryness at not over 135° C. are caught in the same receiver. After the crude motor-fuel has been run off, there still remains a solvent naphtha fraction boiling from 130° to 160° or 170° C.

"The crude motor-fuel is also washed with sulphuric acid, but not so thoroughly as in the case of pure product. This washed motor-fuel is then run through the pure-still in order to remove the last traces of water and any foreign substances which do not settle after washing.

"Products made are coke, gas, tar, ammonium sulphate, benzol, toluol, solvent naphtha, and naphthalene.

"The plant has a boiler-house containing two 350-horse-power boilers which operate the by-product and benzol plants as well as unloading apparatus on coal-docks. There is also a well-equipped office and laboratory. All buildings are of steel and concrete and the plant well constructed."

Alice Arm Section.

This section will include for the purposes of this report that portion of the Mining Division bordering Alice arm from Observatory inlet to the head, at the town of Alice Arm. The general term of Alice arm, as applied by the public, I have subdivided into the Kitsault River section and Illiance River section. The accompanying sketch-map gives a general outline of these three sections.

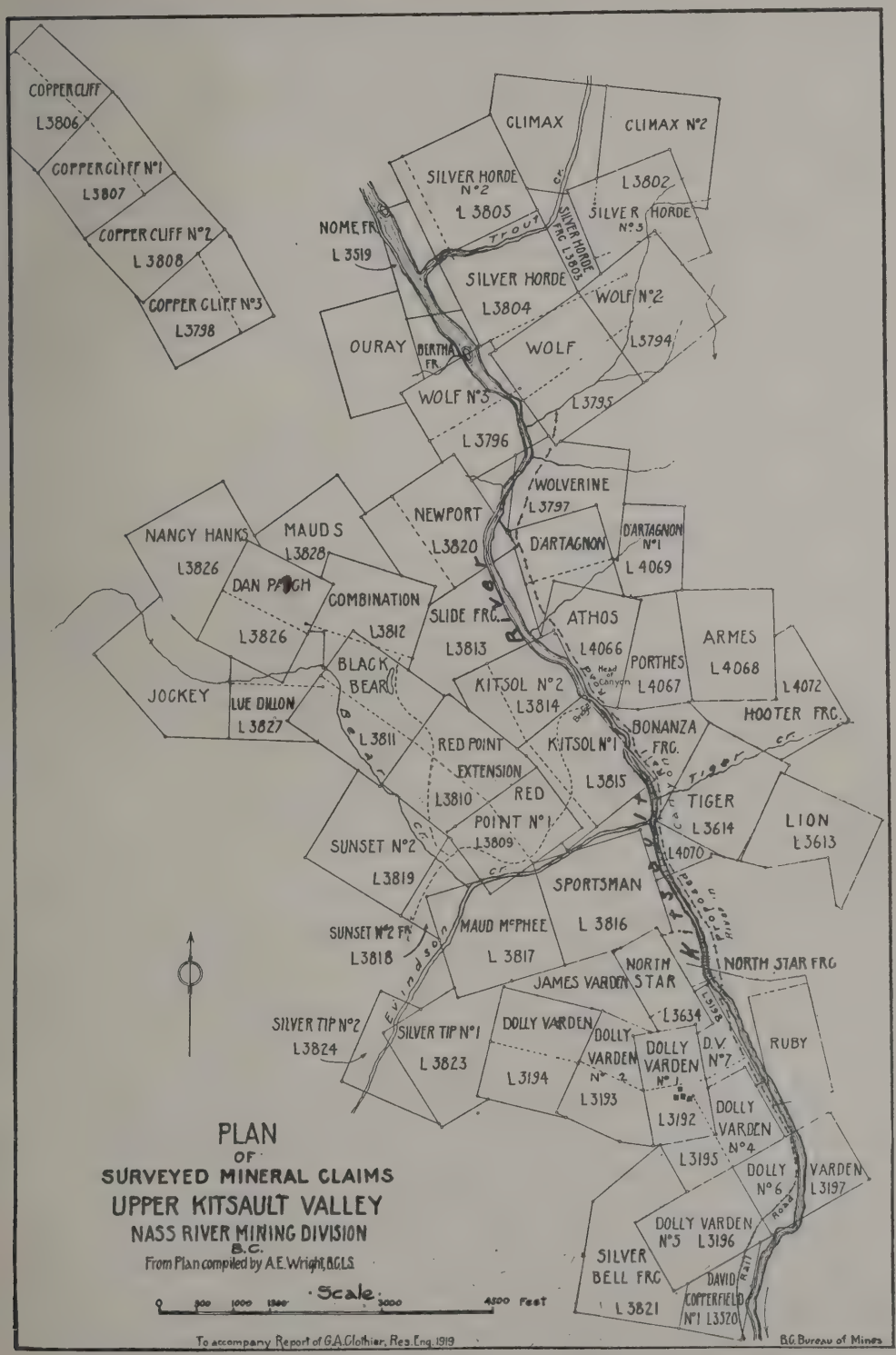
There has been very little mining done in this section other than the necessary yearly assessment. The property of the Molybdenum Mining and Reduction Company on the north side of the arm has been idle all year. On the south side of the arm there are a number of locations on Roundy and Lime creeks, but owing to lack of time I had not the opportunity of visiting them this year.

Acknowledgment is due A. E. Wright, B.C.L.S., of Prince Rupert, for his recent map of surveyed claims of the upper portion of the Kitsault river. This gives definite information, enabling one to accurately locate claims that have not been surveyed.

Kitsault River Section.

This embraces the Kitsault River valley and smaller tributary valleys from the town of Alice Arm north to the head of the river, about twenty-six miles. It is reached by Grand Trunk Pacific Coast steamers from Vancouver or Prince Rupert to Anyox, from which point there is a launch running to Alice Arm, also by Union Steamship Coast steamers, giving weekly service from Vancouver and Prince Rupert direct to Alice Arm; from Prince Rupert to Anyox about ninety-five miles and to Alice Arm about 107 miles.

Since the completion of the Dolly Varden Railroad this year, a distance of eighteen miles up, the Kitsault valley has been practically placed on tide-water. From the end of steel a first-class pack-trail is being built by the Government to the head of the river, a further distance of about eight miles; consequently transportation in this section is excellent.


COPPER CLIFF L3806
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COPPER CLIFF N°3 L3798
CLIMAX
CLIMAX N°2
SILVER HORDE N°2 L3805
L3802
SILVER HORDE N°3
NOME FR. L3519
TROUT CK.
SILVER HORDE FRG. L3805
SILVER HORDE L3804
WOLF N°2 L3794
OURAY
BERTHA FR.
WOLF
WOLF N°3
L3795
L3796
WOLVERINE L3797
NEWPORT L3820
D'ARTAGNON
D'ARTAGNON N°1 L4069
NANCY HANKS L3826
MAUDS L3828
DAN PATCH L3826
COMBINATION L3812
SLIDE FRG. L3813
ATHOS L4066
ARMES L4068
PORTHOS L4067
L4072
HOOTER FRG.
JOCKEY
LUE DILLON L3827
BLACK BEAR L3811
KITSOL N°2 L3814
Head of Canyon
BONANZA FRG.
KITSOL N°1 L3815
RED POINT EXTENSION L3810
RED POINT N°1 L3809
TIGER L3614
LION L3613
L4070
SUNSET N°2 L3819
SPORTSMAN L 3816
SUNSET N°2 FR. L3818
MAUD McPHEE L 3817
NORTH STAR
NORTH STAR FRG.
JAMES VARDEN L3634
SILVER TIP N°2 L3824
SILVER TIP N°1 L 3823
DOLLY VARDEN L3194
DOLLY VARDEN N°2 L3193
DOLLY VARDEN N°1
D.V. N°7
RUBY
L3192
DOLLY VARDEN N°4
L3195
DOLLY VARDEN N°6 L3197
DOLLY VARDEN N°5 L3196
SILVER BELL FRG. L 3821
DAVID COPPERFIELD N°1 L3520
PLAN
OF
SURVEYED MINERAL CLAIMS
UPPER KITSAULT VALLEY
NASS RIVER MINING DIVISION
B.C.
From Plan compiled by A.E. Wright, B.C.L.S.
Scale.
0 500 1000 1500 2000 4500 Feet
To accompany Report of G.A. Clothier, Res. Eng. 1919
B.C. Bureau of Mines

There has been extraordinary activity throughout the summer, especially in the last three or four months. In the early spring this part of the district suffered a rather serious attack of "promoter's blight," several properties being bonded without any provision being made in the agreements for work to be performed. Later on, however, this was remedied and considerable development is now under way; five or six properties are being developed through the winter.

In addition to the main trail up the river, the Government has also started a trail up Trout creek, about a mile of which was built this summer and it will be completed next season. The Mines Department has given assistance, on a fifty-fifty basis, to several prospectors for trail-building.

The Taylor Engineering Company's property, formerly the Dolly Varden Mines Company, has at last been added to the shipping-list and has made a most enviable record for the short time it has been producing. This has established the needed confidence in the section and has resulted in a wonderful impetus to mining activity. At present there are few of the more promising properties that are not being developed or under option for next year. With railroad transportation assured, encouraging results from development-work to date, many properties under bond for next year, and the vigorous operation of the *Dolly Varden*, Alice Arm gives promise of being one of the most energetic camps in the north next year and of developing into a permanent mining town.

This section represents another small area on the Eastern Contact Belt containing, so far as yet known, bonanza deposits of high-grade silver ores in the *Dolly Varden* and many other extraordinary surface showings of silver ores lying in greenstone or andesite or its altered form, locally termed the "silver-belt." There are hundreds of miles of the Eastern Contact Belt in this district entirely unexplored, some of it more difficult of access, but probably equally as rich.

Independent Group.

This group consists of three claims, and is owned by Archie McPhail, of Alice Arm. It is situated just above the town of Alice Arm and about half a mile from tide-water. The property was under bond this year to D. J. Hancock, who did a lot of work on it, but without satisfactory results. The tunnel was extended to 240 feet, following the vein all the way, except for the last 10 feet, where it seems to split up and disappear. The dyke which has persistently accompanied the vein has changed to a soft seam, possibly accounting for the expiration of the vein. A shaft has been sunk from the surface to a depth of 14 feet, showing well-defined slate walls about 6 feet apart. The vein-filling is about 5 feet wide in the bottom of the shaft, of nearly pure quartz. The quartz is evidently of low value, and since the tunnel driven under it at a vertical depth of 65 feet did not show any improvement in the vein or values, the showing may be considered as unimportant.

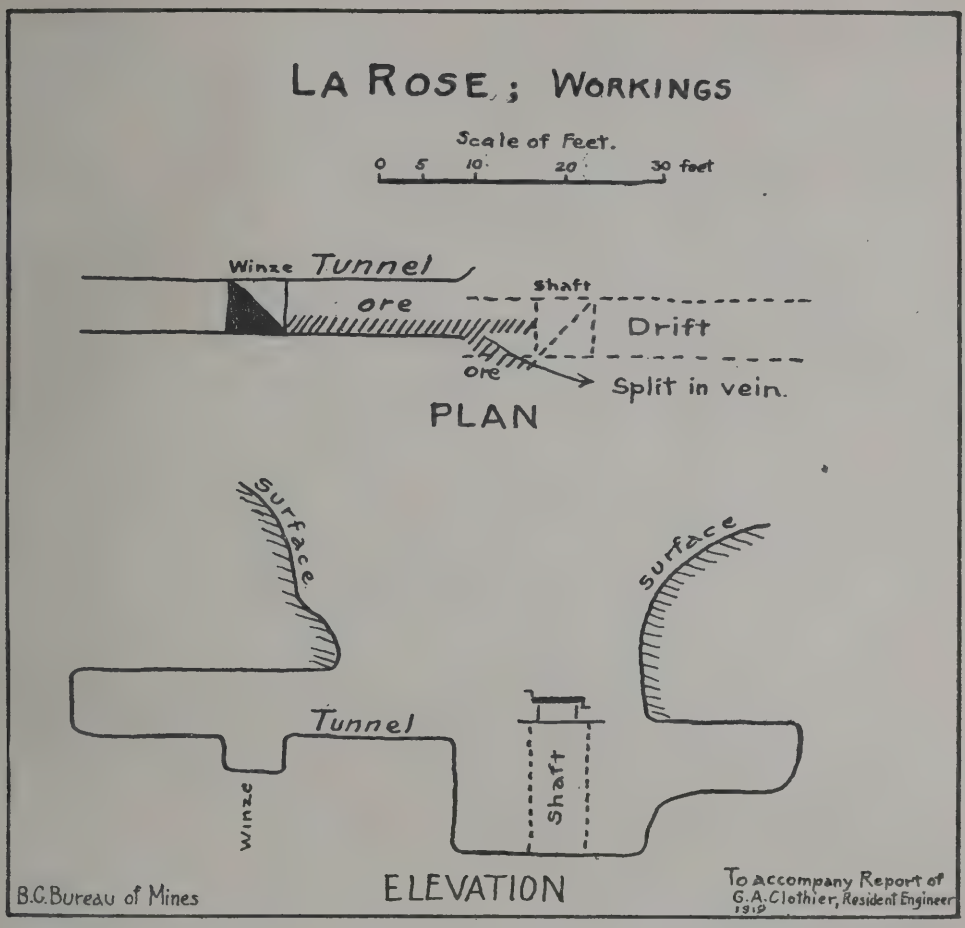
Black Bear Group.

This group consists of three claims—*I Chance It*, *Aldebaran*, and *Black Bear* (formerly the Roundy property)—and is now owned by Salinas Bros., W. J. Vaughan, and A. J. Luffgren. This is one of the oldest properties in the section, and has had extensive work done on it and produced a considerable tonnage of high-grade silver-sulphide ore. The vein is quartz, carrying in places high values in ruby and native silver, argentite, and grey-copper, with a little zinc and galena. It lies in the slate formation conforming with the bedding-planes of the country-rock. The ore appears to follow a monoclinal fold in the slates, the values in the lower levels occurring in the trough of the fold, while in the upper workings I believe the best values were found on the side of the fold. Numerous dykes can be seen, and it looks as if a fault on one of the upper dykes had thrown the upper portion of the vein to the west. The property has not produced any ore of importance for some time, for the reason that all the available ore had been extracted and differences amongst the partners prevented further exploration. This year, however, one of the Salinas Bros. (Baldy) drove a crosscut tunnel at an elevation of 460 feet, or below the older workings, and at the time of my visit had just struck 18 inches of fine-looking ore at a distance of 60 feet in the tunnel. This will be mined and shipped by the owners this winter.

La Rose Group.

This group consists of two claims—*La Rose* and *La Rose No. 1*—owned by Miles Donald and partners, of Alice Arm, and situated on Paul Klayduc creek, two miles from the Dolly Varden Railroad, from which there is a good pack-trail to the mine. The general formation is a fine-grained greyish rock. The vein is quartz carrying blende, galena, pyrite, grey-copper, argentite, and native silver.

Considerable work has been done by the owners each year, from which about 50 tons of ore has been extracted and shipped, giving average returns of over 250 oz. silver to the ton. Early



this year the owners shipped 22 tons to the Trail smelter, which yielded 3 oz. gold and 6,157 oz. silver. A tunnel has been driven, following the vein from the surface for about 125 feet. This was started on ore which continued for about 40 feet from the portal, where a short winze was sunk on it. It was decided, however, to sink a shaft at the mouth of the tunnel in order to be in the best part of the ore-shoot and at the same time provide for ore-sorting facilities in daylight. The shaft was sunk 14 feet, drifted on both ways from the bottom, and some very fine ore stoped out. There is about a foot of good ore in the bottom. Further sinking would be required to take out more ore.

To the north of this showing the hill falls rapidly along the strike of the vein, and it would be good development-work to try to pick up the vein at some depth to drift on it. On account of a slide that would be dangerous in winter, it would require a crosscut tunnel possibly 450 feet long to get to the vein, which would give a depth on it of about 200 feet below the present workings. There is every reason to suppose that there are other ore-shoots in the vein similar to the one now being worked, and if these could be opened up at a depth of 200 feet it would put the property on a profitable basis.

Judging from the persistence of the vein so far, the extent and value of the ore-shoot already opened up, and taking into consideration the location of the property for shipping, I would have no hesitation in recommending the undertaking of the development-work mentioned.

There is also a big quartz vein on the property that has had no exploration and which would be well worth considerable development.

Cape Nome Group.

These three claims—*Nome*, *Rambler*, and *Eldorado*—are being opened up by the owner, Sid Miller, of Alice Arm. He is driving on a well-defined vein of banded slate and pyritized quartz lying in a slate country-rock. The mineralization and appearance of the vein improves as drifted on and the owner reports good gold values in picked samples. The property has the advantage of an ideal location, the tunnel being a few hundred feet from and on the same level as the railroad.

Central Group.

This group is composed of three claims—*Homeguard*, *Traveller*, and *Central*—owned by William McFarlane and Dan Kennedy, of Alice Arm. The claims are located on the east side of the Kitsault river, extending from the river up the hill, about fourteen miles from tide-water and just across the river from the Dolly Varden Railroad. The river is crossed at the camp by a cage suspended on a cable. The property is therefore ideally located for operating and shipping facilities. The river at this point is at 600 feet elevation above the sea.

The first showing is at an elevation of 1,000 feet, or about 350 feet above the railroad, and consists of an open-cut along the side of the hill, exposing a width of about 20 feet of brecciated country-rock of greenstone cemented together with calcite. The calcite is heavily mineralized with pyrite and chalcopyrite. A 12-foot 6-inch portion across the face of this exposure assayed as follows: 4 feet 6 inches in width, $2.40 in gold and 6 oz. in silver to the ton and 3.9 per cent. copper; 8 feet in width, 60 cents in gold and 2.4 oz. in silver to the ton and 3.5 per cent. copper.

The property was at one time under option to the Granby Consolidated Mining, Smelting, and Power Company, which did some prospecting by diamond-drilling. Four or five holes were put in from the face of the showing, proving it to be an immense boulder of ore, the drills going through it and into loose slide-rock on the other side. About 50 feet above this and diagonally up the hill is another huge boulder of the same kind of ore. At a further distance of 75 feet up the hill a tunnel has been driven along the side of another boulder of ore for 30 feet, getting into big boulders of country-rock at the face. Some distance up the hill, at an elevation of 1,275 feet, a tunnel has been driven by the owners a distance of 130 feet. The first 20 feet from the portal is through a boulder of ore; from there to a point 118 feet from the collar was driven through coarse boulders of country-rock, encountering no more boulders of ore; the balance of the tunnel, 12 feet, is in the solid andesite country-rock. From the fact that no more boulders of ore were found in driving through the slide-rock it would appear that the ore boulders were the last to come down, or nearly so. Just on the edge of the hill above, a wide dyke crosses the country, and it may be possible that in the intrusion of the formation so close to the edge of the hill the outer, weaker portion has been shattered and disintegrated into the huge boulders found in the rock-slide below. The location of the ore-masses, diagonally up the hill, would suggest the same strike for the vein in-place; therefore by turning the tunnel to the right would be driving toward the vein at right angles to it. Judging from the size of the float-boulders, the ore in-place must be 20 feet or more in width.

The average value of 12 feet across the ore is about $20 a ton, and with its excess of lime should make a very desirable smelting-ore. I should judge that it would concentrate from 5 to 8 into 1 and make a better than 10 per cent. copper product. If the ore could be found in-place and the vein and metallic content correspond with the ore boulders found, it would make a valuable property. I consider it well worthy of exploration.

Henderson's Claims.

These two claims are located along the Dolly Varden Railroad just below Spring camp, or Mile 9. Some good-grade silver ore was reported found on these claims. I found a small vein of slate and quartz about a foot wide lying beside a dioritic dyke that cuts across the slate formation. No values were obtained in a sample taken from this vein. Farther south is a broad belt, 50 feet wide, of slaty rock, in which are small veinlets of pyritized quartz and calcite which I did not consider of importance.

David Copperfield Group.

There are two claims in this group—*David Copperfield No. 1* and *Silver Bell Fraction*—situated adjoining the *Dolly Varden* group on the south. The property is owned by W. McLean, R. McGinnis, of Alice Arm, and A. E. Wright, B.C.L.S., of Prince Rupert. Some surface work has been done in open-cutting and stripping, and a 10-foot tunnel, about 25 feet above the river, driven on a vein of quartz and barite carrying a little galena and assaying a few ounces in silver. Above this an open-cut 5 feet wide shows a similar vein, evidently low grade. Above the old *Dolly Varden* trail two

open-cuts also expose the same vein material. At 1,855 feet elevation a cut 16 feet wide shows that width of vein, and another cut at 1,915 feet elevation exposes the same width. These exposures of quartz and barite carry varying amounts of galena and better values in silver are found wherever silicification is strongest.

I have been reliably informed that the property has been recently bonded to Toronto interests by Mr. Wright.

Dolly Varden.

The Taylor Engineering Company has been operating what was formerly the property of the Dolly Varden Mines, Limited. The holdings are situated on the west side of the Kitsault river, about eighteen miles from tide-water at Alice Arm. At the time the property was taken over by the Taylor Engineering Company there had been completed between fifteen and sixteen miles of the railroad from the beach to the mine, the claims had been thoroughly tested, ore-bodies located by thousands of feet of diamond-drilling, and extensive underground development-work done. Also the *Wolf* group, owned by the same company, and situated about two miles and a half farther up the valley on the east side of the river, had been satisfactorily tested by diamond-drilling and about 90 feet of tunnelling and crosscutting done to demonstrate the size and contents of the vein. The present company commenced operations in July of this year under the superintendency of A. W. Davis, to whom much credit is due for the results obtained.

The remaining two miles of the railroad were built to the mine and about half the total road was ballasted. It is a narrow-gauge road, equipped with light rolling-stock consisting of two 20-ton Porter locomotives, one 32-ton Climax-geared engine purchased this year, twelve ore-cars, side-door dump of 10 tons each capacity, and fifteen 5-ton ballast flats. The grading has partly been done for the two miles and a half to the *Wolf* group. This portion of the road, I believe, will be finished next year to comply with the terms of the charter.

A small compressor was in operation at the mine, but was inadequate for the proposed work; consequently a steam-driven power plant was installed at the end of steel. There is a 40- x 60-foot compressor-building housing a 400-cubic-foot-a-minute machine driven by two 60-horse-power boilers (oil-burning), with an electric-lighting plant. A 4-inch air-line 2,500 feet long was laid to the mine. The equipment for the mine consists of new ore-cars, Waugh drills, pluggers, etc., a Canadian Rock Drill Company steel-sharpener, and an ample supply of rails, pipe, steel, etc.

A 2-bucket tramway, with upper terminal bunkers of 100 tons capacity and lower terminal bunkers of 150 tons capacity, was built. The tram is 1,900 feet long, supported by four towers, and equipped with 1¼-ton buckets giving a capacity of 12 tons an hour.

At the mine a combined bunk-house and cook-house, 20 x 120 feet, was built, with separate small buildings for root-house and storehouse. At the end of steel construction consisted of a storehouse, 20 x 50 feet; a two-story bunk-house and cook-house combined, 20 x 50 feet; several cottages for employees; and a water-tank. A two-story bunk and cook-house, 20 x 50 feet, was built along the railroad at 9-Mile. The old bunk-house at Alice Arm was repaired and a work-shop, 20 x 40 feet, built at the dock. To facilitate the unloading of the cars into scows a temporary scheme was installed on the dock, which consisted of elevating the outer rail and tilting the cars to a 33-degrees angle.

Considerable underground work was necessary to get the mine into shape for stoping and shipping, but the first car of ore was brought down over the railroad to the beach on August 28th. Continuous shipments, of approximately 100 tons a day, were maintained until the snow-fall stopped the operating of the railroad. A total of 6,709 tons was shipped for the year to the Granby smelter at Anyox, yielding 423,952 oz. silver, or an average of about 63 oz. to the ton. The above includes a shipment of 42 tons which averaged about 1,280 oz. silver to the ton.

New work this year, other than stoping, consists of some diamond-drilling done with the object of locating the extension of the *North Star* vein, and a new tunnel started about 230 feet below the lowest tunnel for the purpose of opening up the ore-bodies at that depth. Small shoots of bonanza native-silver ore have been encountered in stoping, and I understand that this ore is being sacked and hauled to the beach this winter. Underground development is being continued throughout the winter under the superintendency of Cy. North.

The property has made a phenomenal record for the short time it has been shipping, and, like the remarkably parallel case of the *Premier* mine in the Salmon River section, is compelling the attention of the mining world to the Kitsault River section. The development of the *Dolly Varden* and the showings exposed and proven by diamond-drilling on the *Wolf* give every reason

for believing in wonderful potentialities for this property, its expansion into a great silver-producer, and the consequent progress of this whole section.

North Star. The Alice Arm Silver Mining Company, under the management of James McAleenan, of Alice Arm, has been operating the *North Star* property, adjoining the *Dolly Varden* on the north, for over a year, during which time it has been opened up to such an extent that regular shipments could be maintained if desired. A trial shipment of 27 tons was sent the Granby smelter, giving returns of 968 oz. silver, or 36.6 oz. a ton, with a small and negligible percentage of lead. This ore was taken out in the course of drifting in the upper tunnel and is practically mine-run ore, as very little sorting was done. It would concentrate about 2 or 3 into 1.

A little work was done this year in the upper tunnel, but it was thought advisable to obtain more depth on the vein, and a tunnel was therefore started at 90 feet vertically below this. The vein was struck at 20 feet from the collar of the tunnel and drifted on continuously for 110 feet to the present face. The first 30 feet of the vein, or to 50 feet from the mouth of the tunnel, was low-grade ore, but at that point values increased to about $40 to the ton for the width of the drift, which have maintained to the face. At the time of my visit to the property (September 1st) the vein had just cut diagonally through a small dyke, and the face showed 4 feet of good-grade ore showing ruby and native silver. Judging from the width of the vein exposed in the upper workings, crosscutting in this lower tunnel should show probably 20 feet in width of milling-grade ore.

Assistance was given by the Mines Department in building a short trail from the property to the head of the *Dolly Varden* tramway, thus enabling the owners to send out the trial shipment mentioned. The public-spiritedness of the management of the Taylor Engineering Company in taking this ore down the tramway to the railroad is to be commended. A little more such spirit throughout the mining districts would help.

Though, as stated, this property could be made a regular shipper, it is the intention of the management to continue development and later equip the mine with a tramway to a point on the extension of the Dolly Varden Railroad.

Ruby Group. There are two claims in this group—*Ruby* and *North Star Fraction*—belonging to T. W. Shackelton, of Alice Arm, and under bond at the present time to J. C. Smith, of Seattle, Wash. The claims are situated adjoining the *Dolly Varden* just across the Kitsault river and south of the *Toric* group. The showing consists of a sheared belt in the greenstone, about 15 feet wide on the surface and more or less silicified, the quartz carrying some pyrite and galena. The whole is evidently low grade. A tunnel has been driven 35 feet toward getting under this surface showing, and I have learned that the ore was picked up, but have no information as to its size or grade. There is now a fair trail to the camp, at an elevation of 1,650 feet, branching from the main trail about half a mile above the Kitsault River Crossing. The extension of the railroad to the *Wolf* will cross the property.

Silver Bow, Easterly, and Silver Fox.—These three claims, owned by T. W. Shackleton, of Alice Arm, and O. Besner, of Prince Rupert, lie south of and above the *Ruby* group. They are said to contain the extension of the vein now being opened up on the *Ruby* claim.

Toric Group. This group is owned by John and Gus Strombeck, of Alice Arm. The property is described in last year's Report. This year's work was done in the tunnel on the main vein. It was continued 20 feet, showing 5 feet of well-mineralized vein on the foot-wall; then 8 feet of country-rock; then 4 feet of ore without reaching the hanging-wall. The tunnel is about 150 feet above the railroad-grade. The showing looks as if it would develop into a body of concentrating-ore and the situation is ideal for such a plant. The open-cut at the mouth of the tunnel shows a depth of about 18 or 20 feet of solid andesite country-rock overlying and obliterating the vein, and gives an idea of the difficulties encountered in trying to expose and follow these veins on the surface. The owners claim that the higher showings are even more favourable-looking than that exposed in the tunnel.

Tiger Group. (*See* last year's Report.) This group consists of two claims—*Tiger* and *Lion*—situated north of and adjoining the *Toric* group and owned by Ed. Pickett, of Alice Arm. The property is now under bond to H. B. Price for Eastern interests, with offices in the Pemberton Block, Victoria. About 20 feet below and to the south of the two cuts described in last year's Report is a smaller cut about 6 feet wide, showing argentite and native silver. The vein here is shown to strike N. 60° E. into the hill

and therefore toward the main vein. A tunnel is being driven on this showing this winter, with, I hear, very satisfactory results. The continuation of this tunnel to the main vein will give about 150 feet depth on it. The exceptionally favourable location of this property, along the railroad when it is completed through to the *Wolf*, will admit of the shipping or treatment of a low-grade ore.

Musketeer Group. This property is owned by Miles Donald, Al. Miner, *et al.*, of Alice Arm, and is now under option to A. D. Meenach, of Seattle, Wash. There are five claims in the group—*Athos*, *Porthos*, *D'Artagnan*, *D'Artagnan No. 1*, and *Armes*—situated on the east side of the Kitsault, north of the *Tiger* group. (*See* Wright's map.) They were taken over by Mr. Meenach early in the spring and considerable work has been done on them since that time, though the work was closed down for a time through threatened litigation. The new work consists of an open-cut about 50 feet from the railroad-grade, 40 feet long, and from 12 to 15 feet deep in the solid rock. On the north end of this cut it is well mineralized for a width of 7 or 8 feet, but for some reason the cut was partially refilled, making a close examination impossible. The next 20 feet in the centre of the cut is barren andesite country-rock; the remaining 7 or 8 feet on the south end is pyritized quartz carrying some galena. About 40 feet beyond and above this another cut has been driven in from the creek-bank about 20 feet, exposing 8 feet of heavily pyritized quartz carrying a little galena and showing scales of native silver on the seams. This cut is about 12 feet deep, showing that depth of andesite overlying the ore, with no sign of its cropping through to the surface, exemplifying the difficulties of prospecting for these veins. The owners claim values of 32 oz. silver to the ton across 7½ feet in this cut. The vein appears to strike about N. 60° E. into the hill. Later work now under way consists of a tunnel which has been driven about 100 feet on the level of the upper cut, following along one wall of the vein without breaking into the vein. Very little information has therefore been gained so far, but I believe it is the intention to crosscut the vein at regular intervals later.

Wolf Group. This group is situated north of and adjoining the *Musketeer* group and is a portion of the holdings of the Dolly Varden Mines. It is the proposed terminus of the Dolly Varden Railroad. There has been a tunnel driven on the ore for 35 feet and crosscuts for 60 feet across the vein. About 5,000 feet of diamond-drilling was done on it, proving the existence of an immense body of milling-grade ore.

Silver Horde Group.—This group consists of three claims and a fraction and belongs to Davidson & Miner, of Alice Arm. Very little work has been done this year, but the owners plan starting early in the spring to thoroughly prospect the ground.

Climax Group. This group is composed of two claims—*Climax* and *Climax No. 2*—owned equally by M. P. Olson, of Alice Arm, and O. Besner, of Prince Rupert. The claims are located on the north side of Trout creek and adjoining the *Silver Horde* group on the north. A trail was started by the Government last year from the main trail up Trout creek, which will serve several groups of claims and a very promising country beyond. It will doubtless be completed next year.

A great deal of work has been done on the claims this summer, proving the continuation of the *Moose* veins through them. The work consists of a number of trenches and open-cuts along the side-hill, each about 150 feet long, at intervals up the hill. They expose a shattered zone in the andesite country-rock for a width of from 30 to 50 feet, filled with pyritized quartz and calcite, mineralized with varying amounts of galena. Near the surface these quartz-seams are decomposed, making the rock very easily worked. The mineralization exposed in nearly all the cuts is very meagre, but, judging from the capping over other veins in this section, it is reasonable to expect an improvement with depth. At an elevation of 2,250 feet a cut exposes a very good-looking showing, between 40 and 50 feet wide, of a more altered, more silicified, and consequently better mineralized rock. This exposure should be drifted on. At 2,350 feet elevation a cut 75 feet long has disclosed a width of about 20 feet of quartz well mineralized with pyrite and galena, but low in values. This is a fine showing and lines up with the exposures on the *Moose* group, whose side-line is about 100 feet above. Taking everything into consideration, this is a very promising-looking prospect.

Moose Group. This group consists of four claims adjoining the *Silver Horde*, *Climax*, and *Last Chance* groups. It is owned by Don Cameron, of Alice Arm, and associates. The property was under bond early in the year, but reverted

to the owners later on. No work was done during the summer, but Cameron is driving a crosscut tunnel this winter to get under the best showing on the surface. There is a good showing on this group, a vein about 14 feet wide, with 2 feet on one wall of high-grade shipping-ore. The results of the tunnel when under this showing will be of interest to all the properties in that particular area.

Last Chance Group. There are four claims in this group—*Last Chance No. 1, Last Chance No. 2, Last Chance No. 3,* and *Last Chance No. 4*—owned by Archie McPhail, George Kolbeck, and Pat Morley, of Alice Arm. The claims lie east of and adjoining the *Moose* group and are about three-quarters of a mile up Trout creek from the main Kitsault trail. The showing is exposed along the side of the hill for 300 feet and is composed of a matrix of barite, quartz, and calcite, in which are bedded boulders of all sizes of country-rock. The mineralization consists of pyrite, chalcopyrite, galena, a little blende, and argentite. The main values are in silver. The property has been under bond since early spring to H. B. Price, who also has the *Tiger* group, and is now being prospected by diamond-drilling. No definite or authentic information is available at present of the results obtained. It has a very promising surface exposure and it is to be hoped that diamond-drilling will prove it worth developing on a large scale.

There are a number of claims farther up Trout creek and across from Trout creek to the head of Clearwater creek, from which very fine specimens of ore have been shown, but as yet no work has been done.

Columbia Group. This group consists of three claims owned by Pete Anderson on the north bank of Clearwater creek, about a mile and a half from the Kitsault river. There is a strong vein on this property, but the values have been low where any work has been done. The yearly assessment was the only work done this summer.

Black Diamond Group.—This group is owned by J. Hauber and is located on the extension of the vein through the *Columbia* group.

Homestake Group. (*See* last year's Report.) This group is comprised of four claims owned by A. Davidson and partners, of Alice Arm. The only work done on the claims this year was the surveying of them for Crown grant. It was bonded early in the year to W. A. Somerville and associates, who have incorporated a company called Mineral Claims Development Company. The second payment has been made to the owners and work will be started on the property in the spring.

The same company has taken over at least one other property, the *Tip Top*, owned by H. Mann, above the *Homestake* claims, and, I believe, two other properties are being negotiated for.

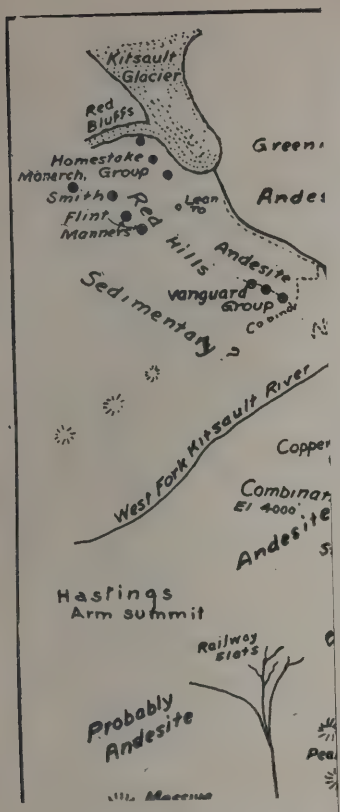
The main Government trail, built this year as far as Clearwater creek, will be finished through to this property next summer and will provide good packing facilities from the end of the Dolly Varden Railroad, about eight miles.

Vanguard Group. This group is owned by Morris Peterson and the Strombeck Bros. The property was described in last year's Report, since which time considerable work has been done on it. The owners built some new trail and improved the old one from the main trail up to the property, with the assistance of the Mines Department. A little work was done in the tunnel driven to get under the big surface showing of chalcopyrite, but this work was not very encouraging.

On the lower showing a crosscut tunnel was driven under 2 feet of solid chalcopyrite exposed on the surface, proving it to have cut off a few feet below the surface. A pyritized, siliceous greenstone is exposed in the tunnel. Below this, on the surface, the vein has been faced up, showing considerable solid chalcopyrite in the seams and decomposed places.

Wildcat Group.—This group is owned by Davidson & Macey and has a little work done this year, but nothing new of importance was found. The other claims in this vicinity have had only the yearly assessments done.

War Dance Group. This property, consisting of six claims—*War Dance, Grouse No. 3, Betsy, Bute, Whistler,* and *Badger*—is owned by A. McGuire. These claims are situated on the west bank of the North-east fork of the Kitsault, which joins the main Kitsault just above the town of Alice Arm. It is about three miles from Alice Arm, across the Kitsault flats to the mouth of the North-east fork, and about four miles from there to the cabin on the property, which is at an elevation of 700 feet. It is a fair foot-trail



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SKETCH MAP

ALICE ARM SECTION

NASS RIVER MINING DIVISION

To accompany Report of
G.A. Clothier Resident Engineer
919

Scale

0 1 2 3 4 5 Miles

Kitsault Glacier
Red Bluffs
Homestake
Monarch Group
Smith
Flint
Manners
Red Hills
Lean-to
Slate Mtn
Greenish and Reddish Diabase Rocks (Alternating)
Andesite or Diabase
Railway Pass Elev 2700'
Lakes
Creek
To Kinskuch River and Nass Valley
Black Diamond Ck
Clearwater
Columbia
Foot log Across Ck
Bluebottle Ck
Last Chance
Trout Ck
Andesite
Vanguard Group
Cabin
Sedimentary ?
West Fork Kitsault River
Moose Falls
Climax
Silver Horde
Wolf
Bridge
Copper Cliff Group
Copper Creek
Dump
Musketeer
Bridge 1100' El
Hooter
Andesite
Combination Mtn El 4000'
Andesite
Bonanza
Kitsault Group
Tiger
Toric
Bridge
Ruby
Silver Bow
Sedimentary ?
Sawtooth Mtn
Starlight
Racehorse (Dan Patch)
Combination
Hastings Arm summit
Black Bear Ck
Red Point
500' El
Cabin
North Star
Silver Tip
Dolly Varden
Railway Slats
Probably Andesite
Bridge
Andesite ?
Andesite
David Copperfield
Surprise
Peaks
Bull Dog Gulch
Evindsen Ck
Massive Mtn
Andesite
Canyon
Andesite
Sedimentary ?
Geology Unknown
Homestead Ck
Wild Cat Medallion
Canyon Boy
Miner Ck
Cable Ferry 450' El
Cabin
Central
Homeguard
Traveller
Trail to Hastings Arm
Sedimentary Rocks and Fragmental Rocks, the latter probably in part Volcanic Origin Cut by Diorite Dykes and Small Andesite Intrusions
This Area Mostly Slates, Argillites
Main
East Ck
West Ck
Cabins
Slate
Trail
Andesite - Granite Contact Unknown
Strike of Most Dykes
Spring Camp
Henderson Claim
Cable Ferry
Riverside Group (zinc)
Quartzite
6500
Quartzite Peak
Ida
Butte
Northern Light
Andesite
Small Canyon
Mud Ck.
Paul Klayduc Ck.
No 9
No 10
La Rose
Haystack Mt
B.C.
Granite Ck.
Granite
Silver Wings
Jones Ck
Copper Crest
Canyon Ck.
Slate
Kitsault River
Red Bluff Sandstone (Tufaceous)
2900'
Falls
Washout Ck
Slate
War Dance
Kitsault R
Motherlode
N.E. Branch
Waverly
Cabin
San Diego
650' El
McGrath Mtn 4000'
Black Bear 45
Mount Theophilus
6000
Alice Group
1150'
Lone Maid
Esperanza
Falls Ck
Wolf
Independence
ALICE ARM
Arberarder
Caribou Fr.
Tide Flats
Dolly Varden M. Co. Wharf
Molybdenum M and R Co
Tram
Flagstaff
Riel's Camp
Granite
Slate
Granite
Alice Arm
Wharf
SILVER CITY
Lime Ck.
Mohawk 2250'
Table Mtn (Volcanic) ?
1975'
Caribou Group (Molybdenite)
Roundy Ck.
Slate
Slate
Sunset
Basin 3900'
Silver Bow
2475'
Last Chance
Granite
Black Bear
Alamosa
Andesite
Slate
Standard
Casey's
Casey Ck
Foxy Grandpa Ck
Copper Ck
Illiance River
Slate
This Area Probably Mostly Sedimentary Conglomerates and Arkose Cut by numerous Diorite Dykes With some Volcanic Tuffs
Sawtooth Ridge
Green-Red Diabases Probably Occur Here
Bridge 1600' El
Trail
Golden Crest
Cabin
To Bowmen's Camp and Mineral Spring
Pass El 2000'
Mashed Diabase Rocks
Glacier
S Fork Tchitin River
Left Over
The Glacier
Yankee Boy
Lake View
Balmoral
Top Notch
Sapphire
Silver Bell
Silver Hoard
Cabin
Monarch
Cabin El 3000'
Silver Star
Silver Star
Joplin
Hotspur
Gray Goose Fr
Cabin
Bellevue Group

B.C. Bureau of Mines

the most of the distance and could be improved to a horse-trail with the expenditure of a few hundred dollars. The trail across the flats should be cut out and improved, and the upper end of the trail up the fork also extended and improved. This area has not been prospected to any extent, but will be. The rock formation up the North-east fork, so far as seen along the trail, is sedimentary or altered phases of it.

The work done on the property has been done by the owner, who deserves credit for the extent to which the property has been prospected and the condition in which he has kept the trail up the river. At an elevation of 850 feet, or 150 feet above the cabin, some stripping and open-cutting on the left bank of the small creek has exposed a number of parallel quartz veins in a slate formation. These veins, which are up to 2 feet in thickness, lie with the bedding-planes of the slate, striking N. 30° W. and dipping from 35 to 40 degrees east. All the veins are well mineralized with pyrite, chalcopyrite, zinc-blende, and a little galena. Several samples taken from different parts of the veins exposed in the cut give fair returns and justify some further work to get well under the surface. A sample across the vein in the bottom of the cut, of 18 inches, gave assay returns of a trace of gold, 1 oz. silver, and 1.5 per cent. copper to the ton. Across the same vein, for 8 inches, on the other side of the cut, a sample gave a trace of gold, 1 oz. silver, and 0.4 per cent. copper to the ton. The vein above this sampled low grade, while a 2-foot vein a little higher, ran $4.40 in gold, 1 oz. silver, and 1.4 per cent. copper to the ton. A sample of the better-looking copper ore assayed $2 in gold, 2 oz. silver, and 3.7 copper to the ton. Other quartz veins show above the cut, which should be extended into the hill to expose the full width of the vein series.

Farther north, on the *Betsy* claim, at an elevation of 1,100 feet, there is a cropping of what appears to be a wide belt of shattered slates, throughout which is a network of quartz veinlets mineralized with zinc-blende, galena, a little chalcopyrite, and pyrite. This has not been broken into at all. A few pieces picked from the surface assayed a trace of gold, 1 oz. silver, and 4.8 per cent. lead to the ton. In places where slabs have slid off the surface it shows a heavier mineralization, and I think it would be worth while to drive an open-cut into it to prove its worth.

Mother Lode and Silver Bar.—These claims also belong to A. McGuire and are situated on the opposite side of the river, farther north along the trail. A small open-cut partially exposing a quartz vein is the only work done.

Waverly, Kitty, and Maxwell.—These claims are located on the opposite side of the river from the *War Dance* group and a little farther south. They are owned by A. McGuire, who claims a big quartz-exposure on them, but they have just recently been staked and no prospecting done.

Illiance River Section.

This section, as the name indicates, includes all the country reached by way of this river from its mouth, at the head of Alice arm, to the Nass River divide and beyond, as some claims have been located over the divide on the Nass River slope.

The Government this year went to a great deal of expense in putting the trail in first-class condition for packing. It is now in good shape to about 11-Mile and doubtless will be completed through to the head of the river next season. There are a number of small, high-grade silver veins in this section that will pay to mine and ship with the trail in good condition. Also it is the shortest and best route to get over on the Nass slope.

All the properties described in last year's Report on McGrath mountain—namely, *Silver Bell* claim, *Lone Star* group, *Silver Band* group, *Standard* group, etc.—have had the yearly assessment-work only done on them, and it is therefore unnecessary to repeat the details of them in this report.

United Metals.

The United Metals Mining Company's holdings comprise three mineral claims—*Joplin*, *Silver Star*, and *Silver Horde*—situated fourteen miles up the Illiance on its west bank. From six to eight men have been employed all summer on the property and an appreciable amount of development done. This work, however, has not tended to open up the showings to any advantage, the greater part of the work being confined to surface work, to open-cutting along the different veins, and to gophering out what croppings of high-grade ore can be found. No attempt has been made to gain any working depth on any of the veins, and the result will be that, when all the surface ore is taken out, deeper development will have to be done for the continuation of operations. Not more than 50 tons of ore was ready for shipment at the time of my visit, and I understand that only a few tons of this has yet

reached the beach, though some twenty pack-horses were taken in for the purpose of getting this ore out. A commodious camp and stable were erected at Copper creek, seven miles up from the beach, to facilitate this work.

The "Cabin vein" has been open-cut for a length of 35 feet and some shipping-ore obtained. The face was 7 feet high, with about 18 inches in width of good ore in it. A crosscut tunnel driven from the creek-level would, in about 150 feet, cut this vein at a vertical depth of about 90 feet if it extends to that depth. Such a tunnel would in all probability cut parallel veins before reaching the "Cabin vein," which I judge to be the main vein, and could be continued beyond if it were thought other veins could be found. The main vein and parallel ones could be drifted on both ways from the tunnel and some definite idea thus gained as to the worth of the property. In drifting north on these veins from a tunnel level a considerable gain in depth would be made, as the ground slopes gradually up the valley. As it now stands, there is no possibility of estimating any tonnage other than a few tons which can be gained from a few small surface showings.

Silver Star Group.

This group consists of the two claims—*Silver Star* and *Silver Star Extension*. They were staked by Juggins & Jones, but are now owned by A. R. Hodgson, of Anyox, and associates. The claims are situated on the east side of the Illiance river opposite the United Metals Company's holdings, from whose camp there is a fair foot-trail over the first ridge, 3,650 feet elevation, to the *Silver Star* camp, at an elevation of 3,525 feet.

The workings are 150 feet lower than the camp. The main work to date consists of a tunnel driven in from a bluff above a small creek. At the time of my trip this tunnel had crosscut the vein for about 6 feet and then drifted north on the hanging-wall of the vein for 20 feet. The crosscut, with the portion of the vein outside of it, shows a total width of vein here of 12 feet lying in a country-rock of light-coloured, clayey schist. There are streaks up to 6 inches in width of very high-grade ore assaying as high as 1,900 oz. silver to the ton, and the whole width of 12 feet will make an excellent mill-feed. Hand-sorting would produce an appreciable tonnage of high-grade shipping-ore. The vein is a more or less silicified country-rock with considerable quartz, in bands and bunches, carrying galena and grey-copper. Later work consisted of cross-cutting back across the vein again for 9 feet and continuing the hanging-wall drift to 40 feet. The drift shows stringers of galena and grey-copper in the light-grey schistose rock the whole distance, and the crosscut at 20 feet in exposes about the same grade of ore. So far as opened up this body of ore would all be of good milling grade. This work is about 30 feet above the old tunnel mentioned in last year's Report.

About 60 feet down the gulch the vein again crops in the wall of the bluff and has been open-cut for a few feet at this point, disclosing 14 inches of solid high-grade galena and grey-copper ore. Just above this another small open-cut shows bunches of ore.

Other croppings on the ridge and along the west side of it, following another small creek, indicate an ore-zone of about 100 feet in width containing small (so far as known) parallel stringers and kidneys of galena and grey-copper. They all conform with the strike of the schistosity of the country-rock, of N. 35° W., similar to veins on other properties in this vicinity. The vein, on which the tunnel has been driven, crops again about 500 feet north at an elevation of 3,550 feet, and again at 3,650 feet elevation about 900 feet north of the tunnel. Altogether this is a very promising property and might easily develop into a profitable concentrating proposition.

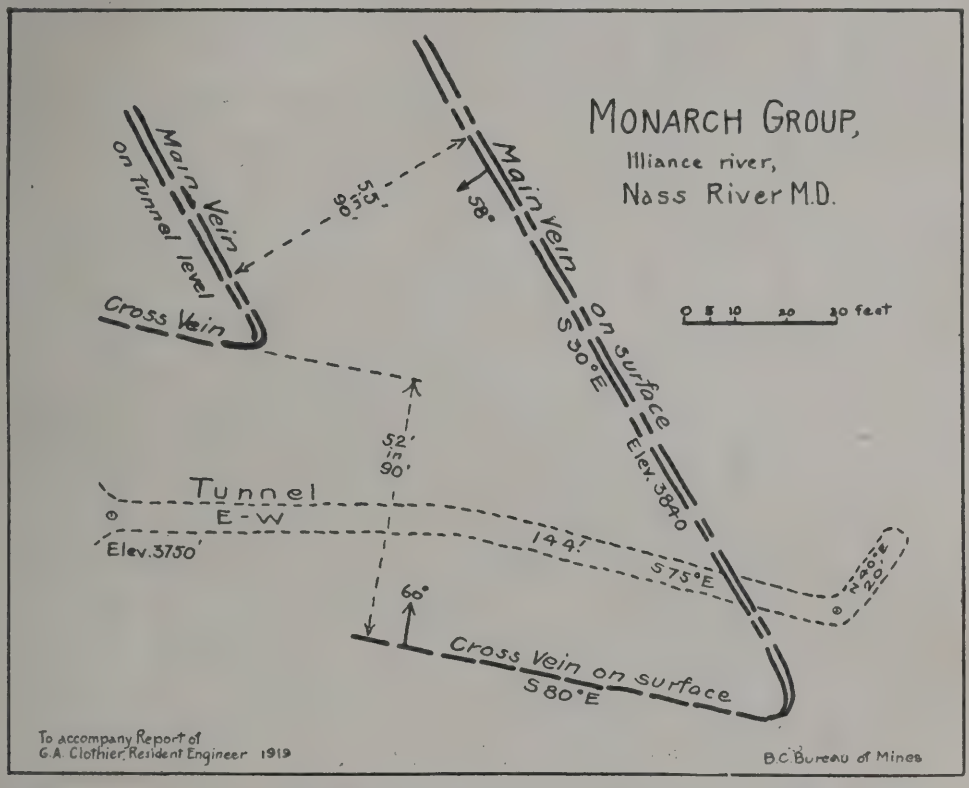
A good 14- x 26-foot two-room cabin has been built this summer. It is the owner's intention to commence operations as soon as snow conditions will permit in the spring. The tunnel will be continued, a crosscut driven to the left from a point 40 feet in (the present face), and as much ore as possible sacked and shipped, depending on the time of completion of the trail.

Silver Bell Group.

This group, consisting of five claims owned by Joe Hayes, W. J. Bradley, and associates, was fully described in last year's report. Hayes & Bradley have done considerable work on the claims again this year, cleaning up all the surface strippings and drifting on the vein where opened up by an open-cut between No. 2 and No. 3 strippings. This was looking fairly well when I saw it, but unfortunately I have no information of the results of the later work at this point. With a good pack-trail to the beach, this property, judging from surface showings, should be able to produce sufficient ore from the surface to be profitable to the owners.

A crosscut tunnel from the main valley above the cabin would procure a working depth under these veins, and from which development would in all probability expose sufficient ore of milling grade to justify the installation of a small concentrator. The silver content in ounces is probably eight times the percentage of lead, consequently a lead concentrate would be a high-grade ore.

Monarch Group. There are two claims in this group—*Monarch* and *Monarch No. 2*—owned by W. B. Bower, of Anyox, and associates. The claims are located just above Summit lake, the source of the Illiance river, on the summit of the divide between the Alice Arm and Nass River valleys, about sixteen miles from tide-water. The elevation at Summit lake is 3,600 feet. There is a cabin on the property, built years ago by Stark & Juggins, who were the original locators of the claims.



The property was under bond a few years ago and a good deal of prospecting-work was done during that time. The surface croppings were stripped for several hundred feet, an open-cut run along the vein for about 200 feet, and another cut, 6 feet deep in places in the solid, was driven about 100 feet on a cross-vein. (*See* sketch.) A crosscut tunnel was started at an elevation of 3,750 feet, or about 90 feet vertically lower than the croppings, and driven 144 feet toward the main vein. From this point a crosscut was turned to the left at right angles to the tunnel and driven 20 feet, making a total of 164 feet from the collar, which undoubtedly would have cut the vein had it extended down on the same dip as indicated on the surface. No sign of the vein, however, was found in this work.

The surface work exposed a strong vein and a very fine showing of ore. The vein is quartz and silicified country-rock, with a little calcite, heavily mineralized with pyrite, chalcopyrite, chalcocite, and a little galena and blende. The country-rock is a schistose tuff, weathering to a dark-brown colour. A grab sample from the surface gave assay returns of a trace of gold, 8 oz. silver, 8 per cent. copper, 6.7 per cent. zinc, and a trace of lead to the ton.

The main vein, as disclosed by open-cuts and stripping, strikes S. 30° E. and dips 58 degrees to the west. There is no indication on the surface of its continuation south of the cross-fracture. The cross-vein strikes S. 80° E. and dips 60 degrees to the north. It will be seen by the accom-

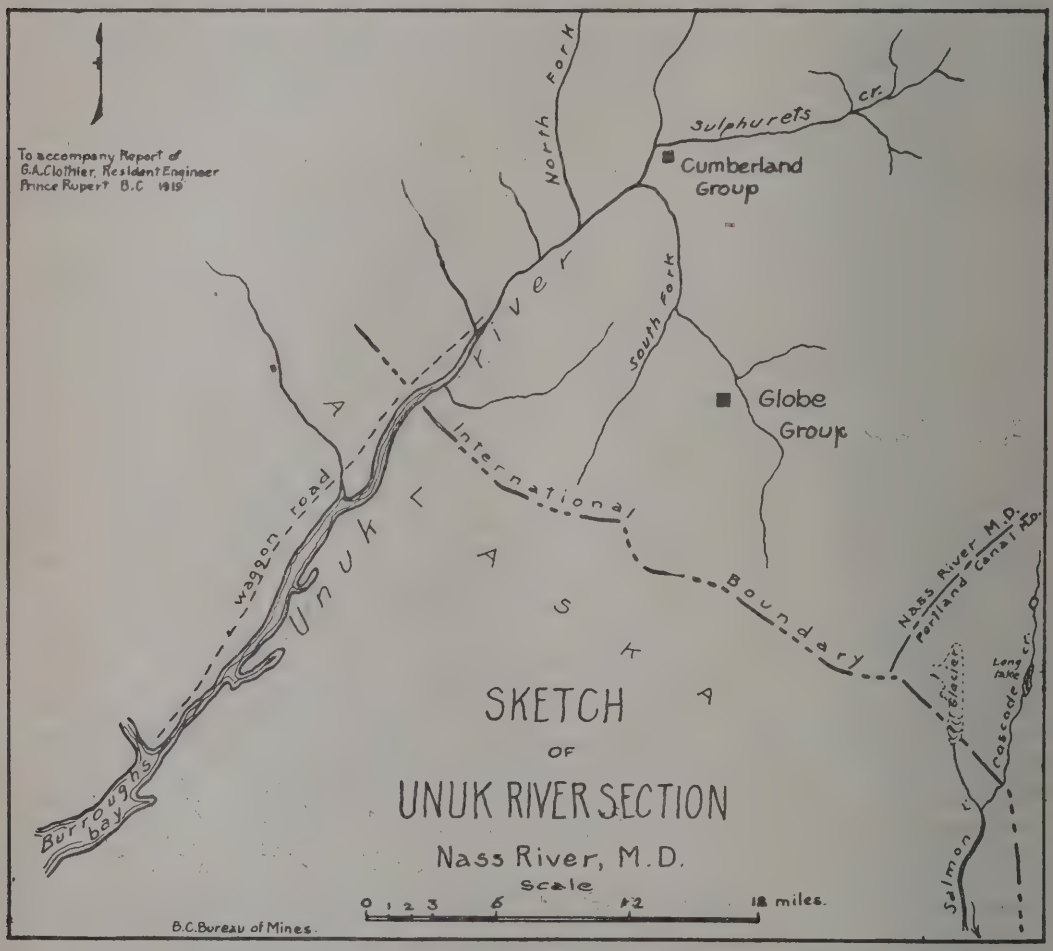
panying sketch that, if the dip of the cross-vein persists below the surface, the tunnel has been driven under the cross-vein and south of the main vein all the way. A tunnel started 70 or 80 feet north of the present one might pick up the vein in about 30 feet.

This season's work consisted of surface strippings and tracing the vein for a considerable distance farther north.

Yearly assessment-work was done on a number of claims in this section and a number of claims staked.

UNUK RIVER SECTION.

As yet the only way to reach this section above the Alaska-British Columbia boundary-line on the Unuk river is from Ketchikan to the head of Burroughs bay, and from there by poling and lining a small boat up the Unuk river. It is about twenty-four miles from the head of the bay to the boundary-line, seventeen miles farther to the mouth of the South fork and a mile or two beyond that to the mouth of Sulphurets creek.



There was some work done in this section in 1903 and three or four following years, when two groups of claims were Crown-granted and are still held by the owners. Claims have been staked from time to time since then, but little or no further work has been done.

From old reports I gather that the rock formation and mineralization is identical with other known areas in the Eastern Contact Belt.

The following are assays of typical minerals from the South fork from a group about twelve miles up: Pyritic ore assays 13 oz. silver and $40 in gold to the ton; steel galena, 12 oz. silver, $20 in gold, and 23 per cent. lead to the ton; complex ores, 17 oz. silver and $18 in gold to the

ton; galena, 36 oz. silver, $20 in gold, and 59 per cent. lead to the ton; pure chalcopyrite, 68 oz. silver, $1.22 in gold, and 32 per cent. copper to the ton; grey-copper, 5,000 oz. silver, $1.75 in gold, and 16 per cent. copper to the ton.

In 1904 a wagon-road was built from the head of Burroughs bay by John W. Daily, who owns a group of claims at the mouth of Sulphurets creek. This road was completed through for eighteen miles, at which point there is a break of 1,200 feet consisting of a rock bluff. Beyond that it was built for six miles to the boundary and two miles beyond. From reliable information I believe the heaviest portion of the construction is over, with the exception of the 1,200 feet of rock-work just mentioned. If this road were put in repair for the twenty-six miles and continued with a trail to the head of the river, it would provide adequate transportation for some years, or until such time as the country was sufficiently developed to justify the continuation of the wagon-road.

PORTLAND CANAL MINING DIVISION.*

This is the smallest Division in the Province, including only that portion along Portland canal west of the summit of the range between Portland canal and Observatory inlet, which extends north to the headwaters of Bear river, American creek, Cascade creek, and Salmon river. It contains, therefore, a comparatively small portion of the Eastern Contact Belt. However, all that part of it north of the head of Salmon river toward the Unuk river is reached by way of Stewart, up the Bear river and over its divide, or up the Salmon river and over the glacier at its head, or over Long Lake glacier at the head of Cascade creek. As Portland canal is the natural outlet for all the country, it should possibly be contained in the Portland Canal Division rather than the Nass River Division, as under the present boundaries.

Note by Provincial Mineralogist.—Since this report was written there has been a change in the boundaries of the Portland Canal Mining Division, to take effect on and after the 2nd day of July, 1920. The boundaries as now defined are as follows:—

"Commencing at Ramsden point separating the entrance to Portland canal from the entrance to Observatory inlet; thence northerly along the divide separating the drainage area of the said canal from the drainage area of the said inlet to Mount Brown; thence easterly along the divide separating the drainage area of the Kshwan, Kitzault, and Kinskuch rivers on the south from the drainage area of White river and Paw creek on the north to a crossing of the Nass river north of Cottonwood creek at the north-west corner of Lot 3402, Cassiar District; thence north-easterly along the divide separating the drainage area of Cottonwood creek on the south from the drainage area of Wolverine creek on the north to a point on the western boundary of Omineca Mining Division, east of the south end of Meziadin lake, approximately where the said western boundary of Omineca Mining Division is intersected by the 56th parallel; thence north-easterly and north-westerly following the divide separating the drainage area of the Nass river and its tributaries from the drainage area of the Skeena river and its tributaries to a point where the latter divide is intersected by the divide separating the drainage areas of the Klappan and Iskut rivers on the north from the drainage areas of the Nass and Unuk rivers on the south; thence westerly along the latter divide to the International Boundary; thence south-easterly and southerly along the International Boundary to a point on Portland canal immediately north of Pearse island, and thence south-easterly to the point of commencement at Ramsden point."

That area from the head of Portland canal and which is now demanding the attention of the mining world is reached by way of Stewart, at the head of the canal, 120 miles from Prince Rupert, from which there is now a bi-monthly boat service, which will in all probability be improved to at least a weekly service this coming spring. From Stewart to the head of Bear river is about twenty-six miles over a good wagon-road for fourteen miles to the forks of American creek and Bear river, and from there to the head by a first-class pack-trail which continues through to Meziadin lake and to the telegraph-line at the 6th Cabin. The Portland Canal Short Line Railroad was constructed in 1910 and 1911 from Stewart to the Red Cliff Mining Company's property, fourteen miles up. It has not been operated since 1911, but if mining conditions continue to improve the road will doubtless be again put in commission.

From Stewart to the heads of Salmon river and Cascade creek, by way of Hyder and up the Salmon River valley, is about twenty-six miles. There is a good winter road, which will be completed into a wagon-road next summer, from Stewart to about a mile above the boundary-line,

* Memoir 32, by R. G. McConnell, Geological Survey of Canada.

a distance of fourteen miles, from which point there is a trail through to the property of the Forty-nine Mining Company, a further distance of nine miles. Prospectors going over to the Nass slope can have supplies delivered by pack-train to the Forty-nine camp for about 10 cents a pound, or less when the wagon-road is finished. From the Forty-nine camp it is about eight miles over to the Nass slope, part of the way being over a large glacier. This is the shortest route for prospectors, but any ores developed in that area will eventually be brought out by way of the Bear river, at the head of which the divide is less than 1,500 feet elevation and a feasible route for railroad-construction. The continuation of the railroad for twelve miles to the head of Bear river, and from there following around on that grade on the Nass slope, would be in the Eastern Contact Belt all the way, and in approximately twenty-five miles would reach the area over the divide at the head of Salmon river.

A little prospecting was done on the Nass side during this summer and some very fine specimens of ore brought in. This area will receive increasing attention as the Salmon River basin is proven, and should the mineralization prove as rich as in other parts of the contact it will make one of the greatest mining districts on the continent. It is therefore a matter of the greatest importance to provide ways and means of getting into that section of the country.

For this report the Portland Canal Mining Division will be subdivided as follows: Portland Canal section; Marmot River section; Bear River section; and Salmon River section.

Portland Canal Section.

This may be somewhat confusing with the Portland Canal Division, but is here used to take in that portion of the Division along the canal proper from Portland inlet north to its head at Stewart. Any part of it is easily reached by launch from Stewart or Prince Rupert.

Outsider Group. This group consists of eight claims—*Elsie, Tunnel Fraction, Copper King, Regina, Hope, Brown, Summit,* and *Constance Fraction*—situated at Maple bay, about thirty-five miles down the canal from Stewart. This is the old Brown-Alaska property which was worked in 1905 and 1906, shipping several thousand tons of ore, averaging 2.8 per cent. copper, to the Hadley smelter, then operating on Kasaan peninsula, Prince of Wales island. The property was equipped with an aerial tramway from the mine to the beach, commodious ore-bunkers, freight-dock, power plant, etc., all of which are at present in a bad state of repair. The property lay idle for several years, passing into the hands of the present owners, Martin Woldson and associates, of Spokane, Wash., who resumed operations two years ago. The new work was described in last year's Report, and, as little has been done since, I will not repeat the details here. Its very advantageous situation on tide-water, together with the extensive ore-shoots, though low grade, which have been exposed, make the property well worth investigation.

The *Maple Bay* group at Maple bay and the *Guggenheim* group on Georgia river were also reported on last year, and, as no work has been done since, I would refer the reader to the Minister of Mines' Report of 1918.

Swamp Point.—The Granby Consolidated Mining, Smelting, and Power Company has been operating its lime-quarries here all year under the superintendence of Roy Price, obtaining 41,000 tons of lime rock for its smelter requirements.

Marmot River Section.

This section takes in the area accessible by way of the Marmot river, which flows into the head of Portland canal on the east side, about four miles south of Stewart, from which point it is reached by boat. There is a good comfortable cabin at the beach on Marmot bay, from which there is a first class pack-trail to the cabin at the forks, where the North fork joins the river, a distance of two miles and a half. The cabin is at an elevation of 650 feet. The trail continues up the main river, running east and west, three miles to the glacier, the foot of which has an elevation of 1,375 feet. There is also a trail up the North fork from the cabin to the North Fork basin, a distance of about three miles, to an elevation of over 4,000 feet. It is rather steep in places for horses, but on the whole is a fair trail. This section is therefore very accessible. The mountains on each side of the valley are very precipitous and rather dangerous in places above the forks in winter-time on account of snowslides down the steep draws.

Montana Group. This group consists of seven claims—*Montana, New Republic, Arizona, Comstock, Peach No. 1, Peach No. 2,* and *Horseshoe*—owned by G. W. Bruggy, of Alice Arm, and H. C. Magee, of Stewart. There are two other claims—*Maud*

and *Mary*—also owned by them, which are not grouped with the other seven, but are included in the property for sale. The claims are situated above the foot of the glacier on the west side of the river.

At an elevation of 2,350 feet, or about 1,000 feet above the valley-level, a crosscut tunnel has been driven a distance of 60 feet to a rather flat vein which shows on the surface about 20 feet above the portal of the tunnel. The vein is quartz, varying in width up to 6 feet, mineralized in short lenses with galena, blende, and grey-copper carrying high silver values. The widest part of high-grade ore has been about 2 feet. The vein lies in a spur of granite from the main range, which lies about a mile to the west and is easily seen from the trail. The vein strikes N. 40° E. and dips into the hill at 25 degrees to the north-west.

Two drifts have been run on the ore from the end of the tunnel, one 10 feet south-west and the other 40 feet north-east, and a winze sunk on the vein for 30 feet. This was full of water, but is said to show good ore all the way down and in the bottom. The vein has been traced on the surface for about 800 feet. Small shipments of high-grade ore have been made from ore sorted from the underground work and some taken from the surface. The tunnel is reached by following up a small steep creek, which I consider dangerous at any time. A good-grade, safe trail could easily be built and would be a distinct asset to the property.

On the *Horseshoe* claim of this group there are some showings on the east end of it that are reached by following on the glacier around the end of the hill, and from there a trail which has been built up to the croppings at an elevation of 2,950 feet, or 350 feet above the glacier. These showings are of quartz, mineralized with pyrrhotite, with a little chalcopyrite and galena showing in places. A shallow open-cut across a small ridge shows from 6 to 10 feet of mineralized quartz. It is claimed that the heavier iron carries gold and silver values up to $20 a ton. Above this showing about 20 feet, and to the right of it, can be seen another cropping of quartz about 12 feet wide, and all along the end of the range, paralleling the river and broken across at right angles here by the glacier, is heavily iron-stained, but as yet no work has been done to investigate it, except the two cuts mentioned.

High up on the hill above the quartz-croppings a broad belt of limestone crosses the country, while numerous dykes can be seen, running with the general strike of the formation, which appears to be a little east of north. This hill looks well worth close prospecting, and altogether the property is rather promising.

Fraser Group. This group consists of seven claims—*Red Bluff*, *Red Bluff No. 2*, *Ivy*, *Bessie*, *Mt. Marmot*, *Rusty Ridge*, and *Jewel*—which are situated on the east side of the North fork of the Marmot river about three miles from its junction with the main river. They are owned by Wm. Fraser, of Stewart. The camp at the claims, a tent, is at an elevation of 3,400 feet, or about 2,700 feet (two hours' walk) above the cabin at the forks.

The rock formation appears to be a large intrusive mass of altered, more or less schistose, igneous rock, heavily pyritized throughout, with veins of solid pyrite traversing the formation in all directions. There are also pyritized quartz veins cutting through the mass and said to carry fair values in gold and silver. These quartz veins would be difficult to find on account of the whole mass, for a width of 1,000 feet or more, being covered with a reddish to yellow coating of iron oxides. The iron is mainly pyrrhotite, but there is also considerable arsenopyrite and a slight mineralization of chalcopyrite, especially in the small quartz veins and in the oxidized seams and fissures.

The area of oxidization is so large that diamond-drilling suggests itself for prospecting purposes. If the ore was of commercial grade an immense tonnage could be developed. It is well situated for transportation, as the ore could be trammed to the forks and from there to the beach. The valleys are full of timber and water-power could be developed on the North fork. It is worth a careful examination for large operations.

North Fork Basin. This claim is owned by Fraser, Woods & Magee, of Stewart, and is situated above the *Fraser* group in the basin at an elevation of 4,300 feet. The work consists of a shaft sunk 42 feet, following the vein part way, but bearing off into the foot-wall, necessitating a crosscut of 17 feet from the bottom of the shaft to pick up the vein again. The vein is of quartz, 8 to 12 inches wide, carrying high silver values where mineralized with galena and zinc-blende, with grey-copper. A small shipment of 2 tons from the shaft and several places on the surface gave assay returns of 22 per cent. lead,

22 per cent. zinc, and 200 oz. silver to the ton, the whole amounting to $142 a ton at the time of shipment.

The wall of the vein was traced from the shaft down the hill and a tunnel driven along it, getting under the shaft, but finding no vein or ore. This is at a depth of 30 feet below the bottom of the shaft. On the supposition that the tunnel followed the same slip that carried the shaft into the foot-wall, it would take a crosscut of about 29 feet from the tunnel to get over to the vein. The country-rock is a badly folded and distorted schistose rock, seemingly overlying the igneous rock in the *Fraser* group below.

There is a good trail to the tunnel passing Fraser's camp. Some tonnage may be won from the shaft and spots on the surface, and the vein may be picked up on the tunnel-level and more ore found. It could only be worked, on account of the altitude, for a few months in the year, and would probably return the owners good wages while under operation.

A number of claims have been staked in this basin, as well as along the main river, and I believe that further prospecting will prove it to be a promising section.

Bear River Section.*

This section includes all the country north of the head of Portland canal contiguous to the Bear River valley and is reached from Stewart. It was the scene of a considerable boom in 1910 and 1911, which, however, "pinched out," leaving this section in a rather bad position from a mining standpoint. At that time the country had been run over by prospectors, "wild cats" promoted and money lost, while the few more promising properties failed to come up to expectations. Work, however, was continued by the owners on many of the prospects, and though results were encouraging it was hard to induce capital to even take a look. The advent of the *Premier* mine, however, on Salmon river, into the mining limelight has revived interest in the whole section and confidence is gradually being regained. At least six properties in this section were bonded in the late fall, on which work will be commenced as soon as possible in the spring.

There will in all probability be quite a rush of prospectors into this section next year, as it has not been so thoroughly prospected or staked as the Salmon River section. It is the natural route into the upper Nass River country and the outlet for any products, mineral or otherwise. It has been previously pointed out in this report the feasibility of the continuation of the Portland Canal Short Line Railroad over the Bear River divide to open up the country inside of the Coast range when sufficient development has been done to justify it.

The section is well provided with roads and trails, both up the main valley and the tributary creeks. This year the Government completed a wagon-road from Stewart to the mouth of the Salmon river, connecting with the road up that valley to the *Premier* mine. The outstanding need is a dock at Stewart, for the old one is in a dangerous condition.

Since practically all of the properties up the Salmon river are in British Columbia, Stewart will naturally be the business centre for both the Salmon and Bear rivers.

Bear River.

Bayview Group.

This group contains two claims—*Bayview No. 1* and *Bayview No. 2*—owned by George Cameron and W. Cameron, of Stewart. The claims are located on the summit of the divide between Bear and Salmon rivers, overlooking the town of Stewart from an elevation of 4,000 feet. They are reached by a trail starting about half a mile below the Bear River bridge, and the climb is "straight up" to the camp-site at 3,000 feet elevation.

Very little work has been done on the claims. A small open-cut on the *Bayview No. 1* exposes a narrow quartz vein showing galena and grey-copper. About 1,000 feet above this, on the strike of the vein on the *Bayview No. 2*, an open-cut has been driven for 20 feet along a quartz vein about 30 inches in width, well mineralized with galena and grey-copper.

A two-mile tramway would land ore at tide-water. The property is under bond to Everett, Wash., interests, who intend opening it up in the spring.

Prince John Group.

This property consists of nine claims—*Prince John No. 1* to *Prince John No. 9*, inclusive—and is owned by James Nesbitt and Andy Archie, of Stewart. The group is located on the west side of Bear river about five miles up from Stewart, on the opposite side of the river from the railroad. It is ideally

* Memoir 32, by R. G. McConnell, Geological Survey of Canada.

situated for mining and transportation. A tunnel at an elevation of 2,350 feet has been driven 185 feet across the formation and mineralized belt. The cross-section exposed in the tunnel shows 30 feet of greenstone-schists from the portal; then 45 feet of banded slate or argillite mineralized with pyrite and chalcopyrite, disseminated in grains throughout the slate or in small veins and bunches lying in the bedding-planes and cross-fractures; then 45 feet of a light-grey acidic dyke-rock; and beyond that, 65 feet to the face, of slates slightly mineralized with pyrite and chalcopyrite, hardly of milling grade, but worth drifting on. The 45-foot section of ore will average about 2 per cent. copper and $1 a ton in gold and silver values, with portions in it of fairly good ore.

A lot of surface work has been done on this showing, disclosing ore of about the same tenor as that in the tunnel. A little work has recently been done in the tunnel just beyond the dyke, a few shots showing some nice streaks of chalcopyrite. This belt deserves deeper exploration.

The owners were opening up a quartz-cropping in the slates below the tunnel at an elevation of 1,750 feet. Sufficient work had not been done to get a very definite idea of it, but it appeared to be a strong vein, probably 6 feet wide, paralleling the belt above. The quartz is mineralized with pyrrhotite and chalcopyrite, the heavier iron said to assay $5.75 a ton in gold.

Gibson Group. This group is composed of four claims and is owned by H. P. Gibson, of Stewart. They are located in the argillite-belt, termed by McConnell "the Bitter Creek formation," south of the Portland Canal Mining Company's claims on the Bear River slope. The claims are reached by way of the old *Portland Canal* mine trail, passing the workings and continuing up the hill for probably a mile. In the event of the showings developing into any appreciable tonnage of shipping-ore, a tramway about a mile in length straight down the hill would land ore at the railroad.

Very little work has been done, consisting only of a few open-cuts and a little stripping. The first showing, at an elevation of 3,900 feet, where a little stripping has been done, shows a vein width of about 6 feet of heavily oxidized material in which are ribs of quartz. The quartz is mineralized with pyrite, galena, and zinc-blende, and I should judge from its appearance that it would be well worth while to obtain some depth on it in order to get under the surface oxidization. A deep open-cut or a tunnel could be driven in on it from the surface at a considerable depth, or it could be traced down the hill by stripping off the overburden and any desirable depth obtained.

About 400 feet east of this showing and at 3,700 feet elevation is another similar vein shown up by a small open-cut to be about 4 feet wide, with about a foot of quartz in the centre heavily pyritized and showing some galena. This also could be easily opened up at depth.

Judging from other similar veins in the same formation, there is a good chance of opening up high-grade silver ore, and the showings are certainly worth some exploratory work.

On the other claims of the group there is a good-sized cropping of hard flinty quartz in argillite country-rock showing along the top of the hill at 4,150 feet elevation. This vein has been broken into in a couple of places down the hill by open-cuts, which expose the vein from 8 to 12 feet wide, mineralized with arsenopyrite and said to carry fair gold values. It might make a concentrating-ore if sufficient tonnage and values could be opened up.

Mayflower Group. This group is comprised of four claims—*Mayflower*, *Trade Dollar*, *Kitty*, and *Blaine*—situated on the east side of Bear river between Glacier and Bitter creeks, and is owned by H. P. Gibson, of Stewart. The property has had some little work done on it by way of open-cutting and a short crosscut tunnel driven, all of which were described in last year's Report. Recent work was done farther up the creek on the surface, with, I understand, satisfactory results. There is a good trail from the valley to the showings, over which ore could be packed.

Independent Group. This is owned by Sam and Jack Fitzgerald, of Stewart. There are six claims in the group—*Independent* and *Independent No. 1* to *No. 5*, inclusive—situated just over the ridge from the head of Goose creek on the Bear River slope. The cabin on the property is at an elevation of 2,700 feet and is reached by a rather poor, steep foot-trail following up Goose creek, and is about two hours' walk from the railroad. The location is ideal for mining and transportation, for a tramway could be built

straight down the hill to the railroad from any tunnel-site on the vein. The hill is heavily timbered and a fine water-power could be developed on Goose creek.

The formation appears to be a greenstone, McConnell's "Bear River formation." The work done so far consists of an open-cut at an elevation of 3,300 feet, exposing a vein 14 feet wide, striking N. 75° W. and dipping 65 degrees to the south. Across the face of the open-cut, which is about 10 feet high, shows 4 feet 6 inches in the centre of quartzy rock heavily mineralized with pyrite and carrying also some galena and zinc-blende, in which the principal values are silver, with a little gold. This appears to be the main portion of the vein. On one side of it is a small, dark-coloured basic dyke about a foot in width. Bordering on both sides of the vein and dyke is quartz diorite, in which are bands of quartz and jaspery-looking quartz. The less silicified portions on each side of the vein are also heavily pyritized and show traces of galena and zinc-blende. Fair average values are claimed across the 14 feet exposed. The bottom of the cut shows a distinct improvement in mineralization over the upper portion.

At the same elevation, and some 50 feet south of the first cut, another smaller cut shows some silicification, sparingly mineralized with pyrite, with a little chalcopyrite showing in decomposed and oxidized places.

The "vein" can be traced for 1,000 feet up the hill, and in one place has been broken into by a 7-foot cut, showing it to consist of more quartz, with little galena in evidence. The whole appears to be a broad band of rather fine-grained igneous rock which has become silicified and mineralized. Average values across the exposures are encouraging, and possibly, with greater depth to get away from surface oxidization and fracturing, it may prove to be an important deposit.

I am informed that the property has since been bonded to W. A. Meloche, who contemplates diamond-drilling it in the spring.

George Copper-mines.

(*See* Minister of Mines' Reports for 1917 and 1918.) This property, owned by W. B. George, of Stewart, and R. George, of Vancouver, includes ten claims—*Mamie*, *Bessie*, *Gold Crown*, *Copper King*, *Copper Queen*, *Copper Lord*, *Castle Rock*, *Helena*, *Royal*, and *Waterfall*—situated on the south side of the Bear river about six miles by first-class trail from the end of the wagon-road, and railroad at the junction of American creek with Bear river. The property and work has been described in detail in two previous reports. The work this year has been done almost entirely on the "Blue vein." It has been shot into in a number of places, tracing it up the hill for several hundred feet; it has also been exposed at the foot of a high, perpendicular bluff, about 1,000 feet below its upper croppings. This would be about the lowest point on the vein at which a tunnel could be advantageously started to drive on it. A trail could be built connecting this point with the camp on the hill, or extended to meet the main Bear-Nass trail along Bear river in the valley below. The "Blue vein" shows a width of 12 feet of a fair grade of chalcopyrite ore.

The "White vein," running with the hill and at right angles to and into the "Blue vein," has the best surface showings on the property. It has been opened up in several places, exposing from 4 to 8 feet of solid chalcopyrite, and has been traced for over 2,000 feet on the surface.

The "Green vein," about 200 feet above and paralleling the "White vein," shows good ore on the surface, and the intervening ground between these two veins has several interesting-looking iron-croppings which deep development might prove extensive enough to make this whole belt workable.

I would like to see a tunnel driven in on the "Blue vein" at the foot of the upper bluff, 4,000 feet elevation, far enough to reach the "White vein" at their intersection, and the "White vein" then explored at that depth.

The tunnel under the big low-grade showing was continued 5 feet, making a total length of 85 feet. The face shows better indications of ore than ever before, in that there are small veins of solid, fine-grained pyrite, with considerable magnetite and hæmatite, all showing traces of chalcopyrite.

I must say that each year's work improves the showings and the value of this property. For examination purposes, probably the most advantageous work would be the further open-cutting of the "White vein."

It would appear, looking up from the valley, a most difficult undertaking to open up and operate this property, but after a few trips over it I am convinced that the drawbacks are not insurmountable.

I am informed that the property has recently been bonded to W. A. Maloche.

Red Top Group. There are about fourteen claims in this group, owned by J. McNeil and J. J. Conners. The claims are located about three miles beyond the George copper-mines cabin on the west side of Bear river. There is a fair foot-trail to the camp, elevation 2,400 feet, from a point about half a mile beyond the bridge crossing the Bear river above the Georges' cabin. It has been adequate for the amount of yearly work done on the property and can be inexpensively converted into a pack-trail when any extensive development-work is assured.

The property was bonded in 1910 and considerable surface work was done, which, however, was not sufficiently encouraging to justify taking over the property, and it therefore reverted to the present owners, whose policy with regard to development-work has not been a very vigorous one.

The lowest showing, at an elevation of 2,550 feet, consists of an open-cut 15 feet deep at the face, exposing a slightly mineralized, broken up, oxidized, slaty-looking rock about 15 feet in width. The hanging-wall, of a coarse-grained igneous rock, probably andesite, is well defined, striking east and west into the hill and dipping 60 degrees to the north. Sufficient depth has not been gained to get any idea of what the solid vein-matter may be. Above this cut, about 15 feet, another cut has been excavated, and the overburden stripped from the vein for a further distance of 50 feet, showing the same decomposed and shattered slaty material as below, slightly mineralized with chalcopyrite. Seemingly the shattered slates have absorbed the surface iron oxides until the whole is a soft earthy mass.

At 2,600 feet elevation the vein has been stripped for a length of 100 feet or more along the side-hill, exposing in places ribs of fairly good chalcopyrite ore. There does not appear to be any definite strike or dip to the vein at this point, or to the hanging-wall, which was so well defined below. It seems to be a mixture of bunches of sulphides in quartz, country-rock, and oxides, all blending into the country-rock above. About 15 feet is the greatest depth obtained anywhere, and it will necessitate extensive exploratory work to define the vein and prove the ore bodies. The property is now under bond.

A number of claims have been staked beyond the *Red Top* this year. The most important of these is the ground of the old *Lucky Frenchman* group, on which considerable work was done in the earlier days of the camp.

Rufus Group. This group, consisting of three claims, is situated on the north side of Bear river, below and across from the *George* copper-mine. This group has been held for some years by the owners, B. Erickson and associates. Unfortunately the owners were not on the property when I was in that locality and I was therefore unable to see it.

Vetron and Comet.—These claims are owned by the same partners and lie north of the *Rufus* group. It is said that some high-grade ore was uncovered on the *Comet* claim this summer.

American Creek.

This is a tributary of the Bear river, flowing into it from the north, about fourteen miles up from Stewart, at the *Red Cliff* mine. It heads in the divide between the Coast and Nass slopes, forming a pass which, owing to its precipitous sides and consequent danger from snow and rock slides, is practically impassable.

There are a number of properties on this creek and extensive development-work was carried on in the early days. There was a good pack-trail from the end of the wagon-road, but it is badly overgrown and needs brushing out for four or five miles up to be of any service. The only property examined was the *Mountain Boy* group.

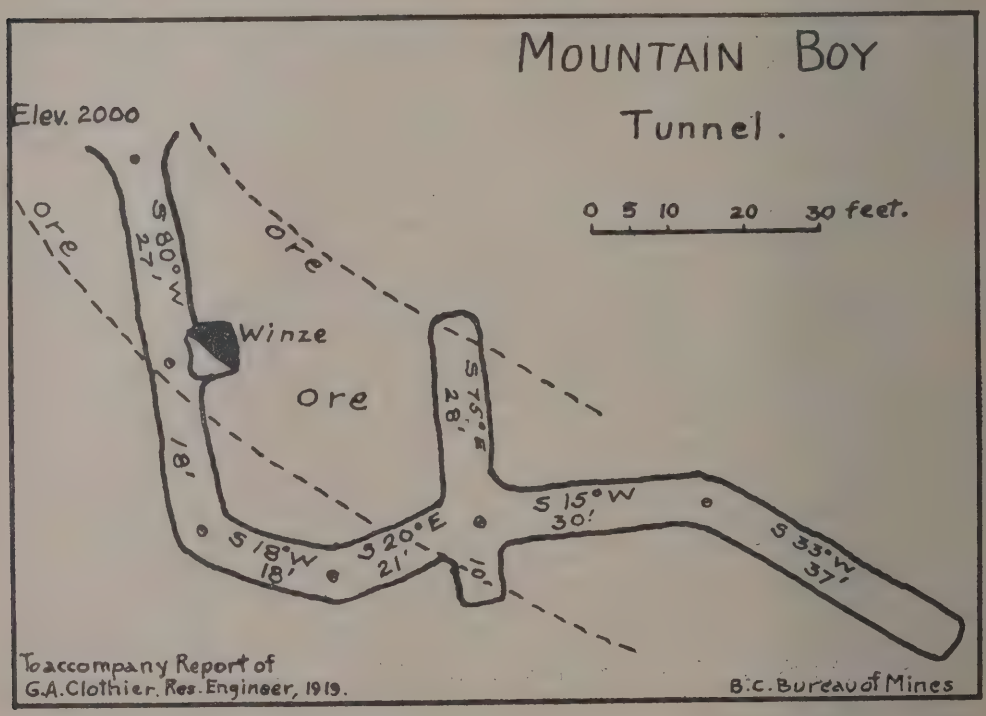
Mountain Boy Group. This property is Crown-granted and is owned by John Conway, of Prince Rupert, and associates. There are four claims in the group—*Mountain Boy*, *American Girl*, *Northern Belle*, and *Hard Money*—which is situated on the west side of the creek, about five miles from the end of the railroad and wagon-road at the *Red Cliff*. The camp is located on a small wooded hill, or "island," in the middle of the valley, which at this point is probably over half a mile wide.

The general rock formation is a reddish-coloured, medium-grained, sometimes porphyritic rock, probably a red andesite. The hills on both sides of the valley are high and very abrupt,

resulting in talus-banks on both sides along the base of the bluffs to an elevation of from 800 to 1,200 feet above the valley.

The tunnel is at 2,000 feet elevation just above the edge of the slide-rock and 1,200 feet above the camp, from which it is reached by a switchback trail now entirely overgrown with willows. A dry day or a diving-suit is now necessary to get to this property from the mouth of the creek until the trail is cleared.

The vein is well defined on the surface, from 16 to 18 feet wide, and consists of quartz and calcite heavily mineralized with zinc and a little galena. It occupies a shear or crushed zone in the andesite country-rock. At the portal of the tunnel (*see* sketch) the strike of the ore is S. 50° W. and dip 50 or 60 degrees to the south. The tunnel has a bearing of S. 80° W. for the first 45 feet, and consequently runs out of the vein into the hanging-wall at about 30 feet from the portal. It was then swung back and again enters the vein about 60 feet beyond, or 90 feet



from the portal, and at this point a crosscut was run 28 feet through the ore. A peculiar feature is shown in the tunnel, where numerous intrusions cut the vein and formation, leaving open crevices running in all directions, which, however, do not appear to interfere with the continuity or contents of the vein in any way. At a point 27 feet in from the portal of the tunnel a winze was sunk 25 or 30 feet in ore. There was no water in it, but the ladders were unsafe and I did not explore it. I did not have time to sample the ore, but the vein is certainly a big, well-defined one, and an immense tonnage could be developed if the values were sufficient for mill-feed.

On the *Hard Money* claim a tunnel has been driven a distance of 70 feet on a similar vein and mineralization about 12 feet wide.

On the *Northern Belle* claim, in No. 1 tunnel, which is 32 feet long, the vein is shown to be 18 feet wide and consisting of quartz and galena, a sample of the galena assaying a trace of gold, 2.8 oz. silver, and 52.5 per cent. lead to the ton.

I judge this property warrants a thorough examination and sampling. Conditions for mining and milling are good and there appears to be plenty of available ore suitable for milling if the values are satisfactory.

Bitter Creek.

Jutland Group. This group consists of two claims—*Jutland No. 2* and *Jutland No. 3*—belonging to J. Cowan, Alex. McGinnis, and Jack Watkins, of Stewart. The claims are situated at the head of the North fork of Bitter creek, eighteen miles from Stewart, nine miles from the railroad at the mouth of Bitter creek, and two miles and a half beyond the old *Roosevelt* property, a little above the junction of the North and South forks. There was a good trail from the Bear River wagon-road at the mouth of Bitter creek to the *Roosevelt*, but it is now badly in need of repairs in several places. This year the owners cut out a foot-trail which crosses a small creek just above the *Roosevelt* camp and follows up the east side of the North fork to the camp. A new cabin has been built not far below the foot of the glacier at an elevation of 2,300 feet.

The general rock formation around the glacier is greenstone or andesite, cut by many dykes, and enclosing in places small masses of sedimentary rocks, all badly contorted.

The first showing on the claims, on the right-hand side of the glacier at an elevation of 3,200 feet, is a small vein about 18 inches wide of quartz and ground-up material, containing from 1 to 8 inches of galena and grey-copper, running high in silver values, the best ore assaying over 200 oz. silver to the ton. This vein strikes S. 50° E. into the hill and stands about perpendicularly. It has been picked into in only one place, and there is therefore no chance of forming an opinion of its worth.

Farther up on the same side of the glacier and at an elevation of 3,525 feet a small quartz vein of high-grade galena and tetrahedrite can be seen on the surface, following along the foot-wall of a band of schistose, slaty rock contained in the greenstone, which in this vicinity has been badly shattered judging from the network of healing veinlets of quartz and calcite. No work has been done on this showing. These two veins may yield sufficient high-grade ore to be profitable.

St. Elmo Group. This group belongs to the same owners as the *Jutland* group. There are five claims in the group—*St. Elmo*, *St. Elmo No. 2*, *St. Elmo No. 3*, and *St. Elmo No. 4*—situated on the west side of the glacier and higher up. I did not get up to these claims on account of the snow, but was informed by the owners that the ore is much the same as on the *Jutland* group, but the veins are larger.

Glacier Creek.

Lakeview Group. This property consists of four mineral claims—*Lakeview No. 1*, *Lakeview No. 2*, *Lakeview No. 3*, and *Silver Bell Fraction*—owned by James McKay and Charles Bibeau, of Stewart, but now under bond to Welch, Fetter, and associates, of Seattle, Wash. The claims are located on the north bank of Glacier creek, about two miles and a half by good trail from the railroad spur at the Portland Canal Mining Company's concentrator, four miles from Stewart. There was a good cabin on the property and additional buildings have been erected by the present bonders. The owners have shipped a few tons of high-grade silver ore from the property each year for a number of years.

The vein strikes about east and west, dips 50 degrees to the south, and can be followed on the surface for several hundred feet. Where exposed by an open-cut the vein shows a cross-section of about 9 feet, of which 4 feet on the foot-wall is mainly quartz carrying a little pyrite, the balance being a heavily pyritized quartz. The whole vein mineral content would probably concentrate 7 or 8 into 1. At the time the property was bonded a crosscut tunnel had been driven 250 feet, which should have cut the vein at a depth of 100 feet, but which, however, failed to find the vein. The present work consists of a crosscut driven west from a point 200 feet in the tunnel, where the vein should have been cut had it maintained its dip as indicated on the surface. At a distance of 50 feet in this crosscut it was turned to the right and encountered the light-grey dyke which lies along the hanging-wall of the vein on the surface. The dyke where cut in the tunnel is 4 feet wide, and at the time of writing the crosscut has been driven a foot or two through it into the vein, which has about the same mineralization here as on the surface.

Since the vein has been definitely located at depth further development will be of keen interest to the remainder of this vicinity. Work is being vigorously pushed this winter, with Al. Harris in charge of operations.

Nabob Group. This group, adjoining the *Lakeview*, was staked during the summer by J. Watkins and J. Cowan, of Stewart, and this fall bonded to C. G. Skoning and associates, of Lead Point, Wash. Mr. Skoning has informed me that it is their intention to equip the property with a suitable power plant and commence work next year as soon as weather conditions will permit.

Ruth and Francis Group. This group was reported in last year's Minister of Mines' Report. Additional work this summer has located the extension of the vein below the present tunnel about 50 feet. The owners, Nesbitt & Archie, of Stewart, are well satisfied with the showing at this point and will continue driving in on it.

Sunshine Group. This group is situated on the North fork of the Middle fork of Glacier creek, about five miles by trail from the railroad spur at the *Portland Canal* mill. There are three claims in the group—*Sunshine*, *Sunshine No. 1*, and *Morning Star*—the first two owned by Fred Young and Godfrey Anderson and the last by Dan Woodmore, of Stewart. The property is reached by the trail on the north side of Glacier creek, passing the *Lakeview* and *Ruth and Francis* camps, and is about a mile beyond the latter and 200 feet lower. The trail to serve this property should therefore break off from the *Ruth-Francis* trail below that camp and cross to the *Sunshine* cabin, thus eliminating the climb and drop of 200 feet. For ore transportation a mile of tramway paralleling the glacier on its north side would land ore at the bridge on the *Ben Bolt* trail, about three miles from the *Portland Canal* siding.

The claims are well timbered and there is plenty of water for camp purposes, while an ample water-power could be developed from Glacier creek. The rock formation is a greenish igneous rock, varying from andesite to diorite, with bands and bunches of argillite enclosed in it. There are four or five known veins on the property. There are two small quartz veins on the *Sunshine* claims, below the cabin and near the glacier, mineralized with zinc-blende, galena, and grey-copper. They are contained in an andesite country-rock.

A few tons of high-grade ore has been taken out of these veins and sacked; however, the zinc content is so high that the ore was refused by the smelters in 1917. It assays 385 oz. silver to the ton. These veins are so small that the cost of getting the ore out would be very high, and the probable tonnage is so uncertain that I consider them unimportant compared with the other showings on the claims.

There is a fine surface showing of chalcopyrite ore, also on the *Sunshine* claims, about 100 feet from the cabin. The vein has been exposed for a width of 8 feet by an open-cut, which, however, has not been driven far enough to definitely determine the width of the vein or get beyond surface conditions. The vein strikes N. 20° E. and dips from 50 to 60 degrees to the west in an andesite country-rock. The vein-filling is quartz, mineralized with pyrite and chalcopyrite, and for an exposed width of 3 feet will average 10 per cent. copper. Several cuts have been put in below this, showing the vein to have split up into a number of small veins occupying a width of over 100 feet, in which are scattered bunches of ore. About 450 feet up the hill above the cabin, or at an elevation of 3,650 feet, another cropping of probably the same vein has had a couple of shots put in it, disclosing from 3 to 4 feet of chalcopyrite ore in a vein width of from 6 to 8 feet. The vein gangue and mineralization are similar to the lower exposure, and if it be the same vein would prove it for a length of 600 or 700 feet on the surface and a depth of 450 feet. About 50 feet below this cropping there are indications in the bed of the creek of a strong quartz vein striking N. 30° W., which would therefore intersect the other vein in a short distance. It would be good development to drift in on this cross-vein to the main vein, which would be intersected at some appreciable depth and would open up both veins. These are very promising showings and well worth opening up by drifting in on them.

On the *Morning Star* claim another well-defined vein is exposed along the bank of a small creek for a distance of 600 or 700 feet, gaining a depth of about 200 feet on the dip of the vein in that length. The strike of this vein is N. 40° E., slightly more easterly than the vein on the *Sunshine* claims, and dips 40 degrees to the east. Along the creek-bed is a belt of diorite which has been the hanging-wall of the vein, but which has broken away, leaving the vein exposed as stated. A few shots have been put in in one place, obtaining a depth of about 5 feet, showing about 2 feet on the hanging-wall of quartz and calcite mineralized with pyrite and chalcopyrite fairly heavily, while the balance is more sparsely pyritized. This also is a very promising surface showing and deserves more work.

Down the hill a stripping from 6 to 8 feet wide and about 30 feet long has disclosed a lens of quartz in argillite, more sparingly mineralized with pyrite and chalcopyrite than the other veins. It is about 14 feet wide and strikes across the bearing of the other veins. Altogether, this is a property of merit and well worthy of considerable development.

L. & L. Group. This group of three claims—*L. & L. No. 1*, *L. & L. No. 2*, and *Marion Fraction*—belongs to Jack Lockwood, of Stewart, and partner. The property is situated on the North fork of the Middle fork of Glacier creek, just across the glacier from the *Sunshine* group. It is, however, reached by a different trail, starting from the Portland Canal Mining Company's concentrator and following what is locally known as the *Ben Bolt* trail to just above the second bridge, elevation 1,025 feet, across the Middle fork. At that point it branches to the left, passing Rush's cabin, which is at an elevation of 3,250 feet, about a mile below the *L. & L.* cabin. (*See* map.)

The main work on the claims is just beyond the cabin up along the south side of the glacier; the latter is certainly an impressive sight from this bank. The development consists of a number of surface cuts tracing the vein up the hill from the mouth of the tunnel. This has been driven about 125 feet on the vein toward getting under the ore-shoot exposed on the surface by the open-cuts. From the portal of the tunnel the vein on the surface is bare of overburden and can be traced without difficulty for 100 feet or more. The first 30 feet shows a small shoot of ore; the next 60 or 70 feet shows no ore, but the vein-fissure can be traced; and from this point the upper ore-shoot has, as stated, been opened up by open-cuts. The lowest one exposes about 10 feet along the vein of from 12 to 18 inches in width of good-grade ore. The vein is quartz heavily mineralized with zinc-blende and arsenical iron in about equal proportions, with an additional small percentage of galena and grey-copper. The next cut, about 25 feet vertically higher, has exposed the vein for a length of about 40 feet, showing the ore to be from 12 to 24 inches wide at the lower end and increasing to 5 or 6 feet at the upper end, where a cross-vein joins the main vein at a small angle. The upper end of this cut is approximately 100 feet vertically higher than the tunnel-level. The next cut, at about the same interval and about 250 feet from the portal of the tunnel, exposes a mineralization of about 8 feet in width, of which about 3 feet is good ore and the balance a silicified and slightly mineralized country-rock. The top cut is about 25 feet vertically above the last and discloses a vein about 5 feet wide, of which there is 2 feet of solid ore. This cut is approximately 300 feet from the portal of the tunnel on the surface and probably 150 feet vertically higher. There is about 200 feet of what may be considered a continuous ore-shoot exposed on the surface.

In the tunnel there is a small shoot of ore for the first 40 feet corresponding with its exposure on the surface. From there to the face the vein-fissure is followed. The face is beginning to show signs of mineralization, in that there are slightly mineralized stringers of quartz for a width of a foot or more. Judging from the ore-shoot exposed on the surface and allowing it the same slight rake into the hill as the small shoot at the mouth of the tunnel, the face should be into the upper ore-shoot within a comparatively short distance, providing, of course, that it extends down to the tunnel-level. The country-rock in this vicinity is classified by McConnell as augite porphyrite.

A ton of ore was sorted out and shipped in 1913 from the first small shoot showing on the surface and in drifting through it in the tunnel. This gave assay returns as follows: 273.5 oz. silver, 22.1 per cent. lead, 11.5 per cent. zinc, 21.5 per cent. silica, and 11.4 per cent. iron to the ton. I think it would not be a difficult metallurgical problem to concentrate the ore into its different sulphides. Should the ore-shoot extend down to the tunnel-level and retain its size and values indicated on the surface, this will make a profitable small property.

Evening Sun and Columbia. These claims are owned by W. W. Rush, of Stewart, and are situated on the South fork of the Middle fork of Glacier creek, about a mile from where the trail forks from the *Ben Bolt* trail and about four miles and a half from the railroad spur at the *Portland Canal* mill. They are old locations and consequently considerable work has been done on them. They lie within the augite-porphyrite area. At an elevation of 2,500 feet, about 300 feet above the cabin, a tunnel has been driven for about 90 feet on a bearing of N. 30° E., following a very well-defined vein of altered and silicified igneous rock. There is an open-cut about 30 feet above the tunnel, from which a few tons of high-grade silver ore was sorted and shipped some years ago. This ore-shoot as proven by the tunnel does not extend to any depth.

The vein stands perpendicularly, with well-defined, slickensided walls, and contains as a rule a band of siderite on each wall with a light-grey gangue between. The siderite carries the main mineralization, of veinlets of antimony and zinc sulphides and occasionally a little grey-copper. No ore of importance has as yet been exposed in the tunnel.

What is supposed to be the continuation of this same vein crops on the opposite slope on the *Columbia* claim. A few tons of ore has been shipped, obtained from small kidneys along the vein-croppings. Numerous open-cuts have been made along the vein, but none of the ore-shoots appear to have much length, and none have been proven at any depth. However, if one were to draw any conclusions from the size and continuity of the vein and the number of small lenses of ore contained in it, it would be reasonable to expect shoots with appreciable tonnage anywhere.

Excelsior and Eagle.

These claims are owned by A. Baggs and W. W. Rush and are amongst the oldest locations in the Bear River section. They are situated high up on the ridge, 4,000 to 4,500 feet elevation, south of the South fork of Glacier creek. There is no trail to them other than the owners' trail from their cabin up over the *Columbia* claim, but a very feasible route has been selected from the *Ben Bolt* camp for a trail to be built next summer. The rock formation is of igneous origin, probably lying within the rim of the augite-porphyry area, with many dykes cutting through it in a north-west and south-east direction.

There are on the claims several veins of a light-grey coloured rock having a general strike of from N. 5° E. to N. 20° E., throughout which are small veinlets of stibnite, sphalerite, and tetrahedrite, while along the wall is usually from 4 to 12 inches of siderite and quartz carrying high silver values in grey-copper, some galena, and considerable zinc.

What has the appearance of being the main shear-zone strikes N. 20° E. and dips about 50 degrees to the north-west. This "vein" is up to 6 feet in width, with a streak of high-grade ore in it of from 4 to 12 inches wide; the balance with veinlets of sulphides throughout it, but probably not of milling grade. The main vein has been open-cut in several places and a great deal of stripping and trenching has been done. At one place the work shows a length of 50 feet of ore that can be sorted to a shipping grade. The high grade seems to lie in numerous small kidneys in the vein-filling rather than in a continuous shoot. Some further depth can be obtained under this showing, but a long tunnel would be necessary to gain any considerable depth.

There are also two, at least, almost parallel veins striking N. 30° E. uphill, and therefore converging toward the main vein and also dipping slightly toward it. One of these "spur veins" looks promising where stripped for 30 or 40 feet. Under this a tunnel has been run 10 feet along the hanging-wall, gaining a depth of about 30 feet. The high-grade ore, from 4 to 12 inches wide, is on the foot-wall and has been left standing until such time as transportation has been provided, when it can be easily mined. This vein can also be readily opened up on the opposite side of the gulch, where its cropping can be seen. In my opinion these veins will not be large producers, but sufficient high-grade ore can probably be sorted out to make them profitable for small operations. The property is deserving of assistance for a trail from the *Ben Bolt* camp.

Taking into consideration the advancement made during the past five years in the processes of concentration of ores, notably that of flotation, and the present and probable price of silver, I believe it would pay some of the older companies to thoroughly investigate their properties and equipment again, especially such as the *Ben Bolt*, the *Portland Canal*, and other silver properties in that locality. Now would be an opportune time to continue the drift in the long tunnel of the Portland Canal Tunnels Company along the main fissure-zone to prospect it, and also to get under the Portland Canal Mining Company's mine-workings.

Salmon River Section.

This section (*see* map) takes in a very small portion of the Eastern Contact Belt lying west of the ridge between the Bear and Salmon rivers and extending north to the headwaters of Salmon river and Cascade creek; in short, it is the drainage area of these two streams north of the Alaska-British Columbia boundary-line. It is about thirteen miles long and from about three miles wide at its lower end to six miles at its northern end, where it extends across the Salmon River glacier; in all, an area of about sixty square miles.

From the head of Salmon river to Clearwater river, a tributary of the Stikine river, is about 100 miles along the Eastern Contact Belt, which with an average width of ten miles gives an

area of 1,000 square miles for exploration, accessible at its southern end by way of the Salmon River valley.

The Salmon River section has had a season of extraordinary mining activity that will have a far-reaching effect on the whole northern portion of the Province. It has been examined and re-examined, sampled and resampled, by many of the most competent and conservative mining engineers in the profession. The result of this has been that the American Smelting and Refining Company has secured a working interest in the *Premier* mine and may be expected to extend its holdings to other properties; the operation of six new properties this winter; the bonding of at least twelve other groups for next season's development-work; and extensive prospecting extending beyond the limits of this section over the Salmon River divide to the Nass slope. All of this would seem to justify the prediction that next year's operations will dwarf this year's, which has been considered an exceptionally active one. It does not need any stretching of the imagination to foresee a wonderfully productive mineral area in this as well as other sections of this district. As the known mineral areas are explored, developed, and brought to the productive stage they will be extended to the Nass slope and north, on the east side of the Coast range, for which railroad transportation will be provided by way of the Bear River divide as the nearest route to tide-water.

The Geological Survey of Canada made an examination of this section this year under the direction of J. J. O'Neill, and at the same time a topographical survey was carried on by F. S. Falconer. This report and geological map will furnish much important information as to the origin, occurrence, and distribution of the ores and their relations to the different country-rocks enclosing the veins. It will prove of great assistance to both prospectors and operators. It is to be hoped that there will be no delay in the publication of this survey, for now is the time it will be of the most benefit.

Acknowledgment is due to Dalby B. Morkill, B.C.L.S., of Stewart, for the privilege of using his timely and very excellent map of the claims in this section. It is compiled from the surveys of a number of groups and is indeed a very creditable and valuable production.

From this map it will be seen that there is little or no vacant ground for staking in the Salmon River valley. Furthermore, it shows the extent of country from the International Boundary-line to the summit at Summit lake, and when this area and its potentialities are compared with that area north from the Bear River divide that has not as yet been touched, it is not easy for one to be conservative regarding the future of that portion of the Province.

The road from the beach at Hyder, Alaska, connecting with the road completed this year from Stewart to Hyder was greatly improved, and, it is said, will be completed from Hyder to the Boundary, thirteen miles, by the Alaska Government and made into a first-class wagon road. With this road extended a further six miles to the *Big Missouri* and *Mineral Hill* properties, it will place operators in the upper valley in good shape to get in any machinery required; provide for ore transportation, especially in the winter-time; give that section the necessary support and impetus for a rapid development to the productive stage; and place the country over the divide within reach of reasonable transportation costs.

It is unfortunate that the construction of a dock at Stewart has been delayed. The present one is in a very dangerous condition and a serious detriment to the handling of heavy freight, such as machinery and ore.

The road has been completed from Hyder to the present dock by the British Columbia Government, thus establishing a thoroughfare from Stewart to the Salmon River valley, but with no shipping facilities.

As will be seen from the statistics of the Government office at Stewart, a great number of claims have been staked this year. In the early spring several of the older and more meritorious properties were bonded and work commenced on them as soon as weather conditions permitted. Permanent camps were erected on the *Forty-nine*, *Big Missouri*, *Bush* mines, and *International*, while temporary summer camps enabled others to get started immediately on development-work. With few exceptions, this year's exploratory work has been highly encouraging and proving an additional incentive to further bonding of prospects.

A number of new companies have been incorporated for the purpose of developing properties acquired, and several properties have been bonded to individuals representing established mining companies.

Many of the properties now under bond were only staked this year, and consequently little or no work has been done on them. In the absence of the owners I was unable to examine such properties, and am therefore not in a position to pass judgment on them or the prospectus issued. I would, however, suggest that the public use some discrimination in its selection of properties and companies in which to "take a chance," confining itself to those prospects which have been reported on by reputable mining engineers. This will eliminate the inevitable "wild-cat" promoter to a great extent and probably save many regrets.

Several prospects on the Alaska side of the boundary-line are developing very satisfactorily. I have been informed by the owner of the *New Alaska* group, Charles Caldwell, that the vein has recently been cut for a width of 20 feet, exposing a good grade of milling-ore for the full width. Other owners and prospectors are enthusiastic over their showings in that vicinity. Dan Lindeborg has a promising showing at 7-Mile, and there are several exceptionally good showings of high-grade silver ore at the head of Fish creek, a tributary of Salmon river.

Of the formation in the Salmon River section, McConnell, in his Memoir 32, says: "The Bear River formation is the most widely distributed formation in the Salmon River district. It occurs bordering the granite a little to the south-west of the International Boundary, on the western slope of Bear River ridge and in the Salmon valley, and, except where overlain by occasional patches of argillites and cut by granitic dykes and areas, underlies the region east of the Salmon river.

"The Bear River formation is predominantly a greenstone formation and represents the products of a long period of vulcanism. The rocks include fine, medium, and coarse vulcanic breccias or agglomerates, tuffs, bands, and areas of massive porphyrites, and occasional argillaceous bands.

"In the Salmon valley the greenstones are usually sheared and pass into coarse greenish and greyish schists, the lines of schistosity being roughly parallel to the eastern edge of the Coast Range granitic batholith and dipping toward it at a high angle.

"The shearing is irregular, some areas being only slightly affected, and usually, but not invariably, increased in intensity approaching the granite."

The chief mineral occurrences of the Salmon River district occur in these schistose greenstones and consist mainly of silicified zones carrying metallic sulphides. Fissuring occurs in connection with some of the deposits; few show well-defined walls, but rather a gradual diminishing of mineralization. The mineralized zones are really bands of country-rock partially and in some places wholly replaced by silica and sulphides. The high-grade silver sulphides appear to occur in the more highly silicified portions of the greenstones or in the quartz veins.

International Group.

This group is comprised of eight claims—*Cabin*, *Group*, *Lucky*, *Daly*, *Grubstake*, *Grub*, *Boundary*, and *International*—and is owned by Pat Daly, of Stewart, and associates. The claims lie just above the boundary-line and are easily reached from the 11-Mile road-house by a good trail. The vein is a silicified country-rock containing small veins of pure quartz, all mineralized with pyrite. The more complete the silicification the better the values appear to be. The surface showing consists of open-cuts on either side of a small creek, disclosing a vein 8 to 10 feet wide lying in a greenish schist. The vein could have been drifted on from this point, but no appreciable depth could have been obtained, and it was consequently decided to run a crosscut tunnel from a lower level. This was started at an elevation of 2,275 feet, giving a vertical depth of 160 feet under the outcropping. It will take about 300 feet of tunnel to reach the vein at that level, and about 90 feet of this was driven when the work was closed down. No further work was done on the surface.

Premier Gold Mining Co.

This company was incorporated early this year and is the reorganization of the former Salmon-Bear River Mining Company, Limited. The holdings now consist of seventeen claims and fractions, as follows: *Essington*, *Rupert*, *Simpson*, *Pictou*, *Cascade Falls No. 4* and *No. 8*, *Daly Fraction*, *Trites Fraction*, and *Pat Fraction*, which are the claims of the original company, and the remaining claims, *Forks*, *Cascade Forks No. 1* to *No. 6*, inclusive, and *Wood Fraction*, being a later purchase from the Bunting Bros. Much romance and the most of the facts have been written of the property, and it would therefore be superfluous for me to go further into its history. I might state that three years ago the property was bonded by R. K. Neill, of Spokane, Wash., associated with whom were Trites, Wood & Wilson, of Fernie. It had been previously extensively explored by New

York people, with unsatisfactory results. Under the management of Mr. Neill, work was started in the upper tunnel, and in a comparatively short distance the shoot of high-grade gold-silver ore was struck which has since brought the property and district into prominence.

The development of the property has been carried on in a businesslike way. Underground exploration has been continuous in a small way. A road from tide-water was started in 1918 and used as a sleigh-road last winter, when 488 tons of ore was sorted, sacked, and shipped to the Tacoma smelter, yielding 3,209 oz. gold and 108,285 oz. silver, approximately $165,000.

This year the road has been greatly improved and will again be utilized as a winter road for hauling out ore this winter. A great deal of work has been done by way of construction. At No. 1 tunnel a blacksmith-shop, 18 x 20 feet, has been built, ore-bunkers remodelled, and a frame building, 24 x 32 feet, built on them for crushing, sorting, and sacking ore. The following buildings have been erected at the camp, the lumber being supplied by a small sawmill which has been under operation all summer: A four-story bunk-house, 30 x 50 feet, the three upper floors, accommodating seventy men, furnished with single beds, electric-lighted and stove-heated, the lower floor for change-room, wash and bath rooms; a two-story mess-house, 20 x 50 feet, remodelled to accommodate seventy men; a two-story office building, 18 x 24 feet; and a two-story assay office, 16 x 20 feet, the upper floor to be used for a laboratory and the basement equipped with the electric-lighting plant for the camp, run by a Pelton wheel, to which is attached a 1,600-foot 4-inch water-line, and also containing the crushing and sampling plant. At No. 2 tunnel, elevation 1,750 feet, a fan has been installed and a snow-shed, 200 feet long, built.

At the Plate tunnel extensive improvements have been made, consisting of a three-story bunk-house, 20 x 42 feet, the two upper floors for sleeping-quarters for forty men and the lower floor for change and wash rooms; a two-story mess-house, 20 x 42 feet; a blacksmith-shop, 18 x 24 feet; and a timber-shed, 30 x 60 feet, in which a fan and a small compressor will be installed for the winter's work in this tunnel. Accommodations have also been built at 9-Mile for teams and teamsters.

The No. 1 or upper tunnel is now in about 600 feet (November 1st), of which about 200 feet has been driven this year. This work has been following the ore, with a few minor breaks, from a point about 200 feet from the portal of the tunnel, where work was started by the present owners, making a total length of about 400 feet of drifting on the vein. In this are shoots of bonanza silver ore, with the balance of the vein, which is estimated to be 20 feet wide, of rich milling-ore. Crosscuts from the old portion of the tunnel show this ore-shoot apparently extending to a point 85 feet from the portal of the tunnel, where it was disclosed by the first work done by Mr. Neill, or a total length of over 500 feet. Three crosscuts have also been driven this year—No. 5 crosscut for 68 feet, No. 6 for 8 feet, and No. 7 for 20 feet.

In No. 2 tunnel the crosscut has been extended to 215 feet, crossing what appears to be the continuation of the ore-body exposed in the mouth of the tunnel.

Further work this winter will consist of shipping all the ore that can be hauled to the beach; driving No. 1 tunnel and raising from Nos. 1 and 2 stopes; the continuation of No. 1 crosscut in No. 2 tunnel; and the extension of the Plate tunnel, which is now in about 600 feet, toward getting under the ore-shoot exposed in No. 1 tunnel, which is 675 feet higher than the Plate tunnel. It is expected that about seventy men will be employed all winter and from 2,000 to 3,000 tons of ore shipped. A snow-tractor will be tried out for ore-haulage this winter. (Proven useless.)

This fall the American Smelting and Refining Company acquired an interest in the property after exhaustive examinations by its engineers. Mr. Neill retains the management, with Mr. Pitt as superintendent at the property. Under this arrangement a vigorous campaign of development and equipment may be expected that will put the property on a producing basis commensurate with the extent and value of its ore exposures.

B.C. Silver Mines, Ltd.

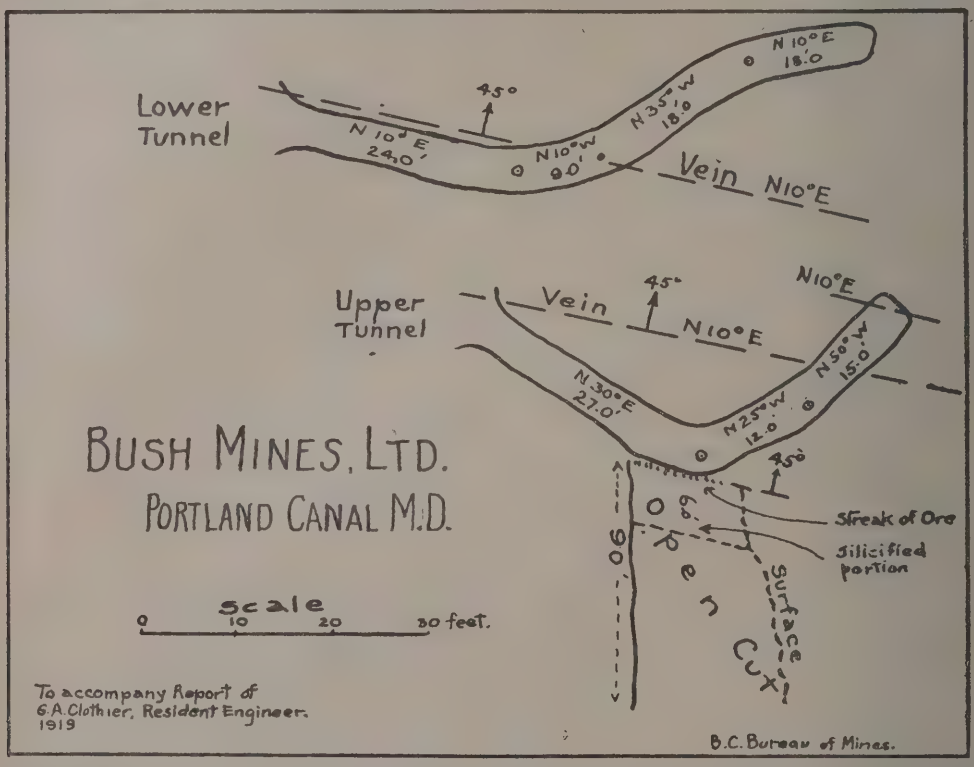
This company has recently been incorporated for $1,500,000 by O. B. Bush to take over the *Lake* and *O'Leary* claims, lying between the *Premier* and the Bush Mines, Limited, and some claims north of the *International* group. I believe that a little work was done on the *Lake* and *O'Leary* property this summer, but as there was no one on it when I was in that vicinity I was unable to make any examination of it.

Bush Mines, Ltd.

The prospectus of the company states that the property consists of six claims—*Leslie*, *Leslie M.*, *Leslie No. 2*, *Leslie No. 5*, *Leslie No. 6*, and *Mahood*. The company is capitalized for $1,000,000 for 1,000,000 shares, and has its head

office in Vancouver. The claims are situated on the East fork of Cascade creek, the showings being about a mile north of the *Premier* camp, and are reached by a trail branching from the *Premier* wagon-road.

A very creditable amount of work has been done this year under the superintendence of Harry Tanner. Good camp buildings were erected early in the spring and a crew of eight or ten men put on development-work. An open-cut was put in along the side-hill for a distance of 90 feet in the solid rock, crossing an altered belt of greenstones. The schistosity parallels the strike and dip of the belt, which is N. 10° E., dipping about 45 degrees to the west. The zone is more altered and silicified, and therefore better mineralized, on both walls than in the central portion. For about 6 feet on the hanging-wall there are small stringers, running in all directions, carrying the main mineralization of high-grade silver sulphides, mainly argentite, while right on the wall is an inch or two of fairly solid ore. On the foot-wall of the zone, also, is about 6 feet of similar formation, but even more sparsely mineralized, and in either the average values would be very low grade. The central part, about 80 feet in width, is slightly pyritized, and with a few unimportant stringers of silver sulphides near the more silicified portions on the walls, the whole giving no indications of containing any appreciable amount of ore. About 15 feet



below the big cut another cut was made 15 feet wide, from which a tunnel was driven, starting on the hanging-wall as indicated in the cut above. The tunnel has a bearing of N. 30° E.; therefore bearing away from the hanging-wall for a distance of 27 feet through a blocky, cross-fractured schist slightly mineralized in places. The tunnel was turned to the left from this point and driven 12 feet at N. 25° W.; then N. 50° W. for 15 feet to the face, where it exposes a small streak of ore striking N. 10° E., the same as on the surface, and evidently the hanging-wall of the zone. Farther down the hill about 20 feet another tunnel had been driven about 60 feet on different bearings. (*See* sketch.) It looks as if this tunnel were off in the hanging-wall. No ore was showing except an occasional streak. Altogether the work done here has not been productive of very encouraging results.

Another tunnel was being driven into the hill about 400 feet farther down the creek. There is a small showing on the surface just above the mouth of the tunnel, but as it was in about

90 feet the face was far beyond this cropping. In the absence of the superintendent I could get no information as to the purpose of this tunnel. It was in country-rock all the way.

Northern Light Group.—This group, consisting of ten claims and a fraction, has been bonded to W. A. Meloche. The claims are situated west of the claims owned by the Bush Mines Company, Limited, and were owned by the Bunting Bros.

Cobalt Group.—This group of three claims, situated north of the *Northern Light* group, was owned by J. Hovland, of Hyder, Alaska, but has been bonded to W. A. Meloche.

Spider Group. There are three claims in this group—*Spider*, *Spider No. 2*, and *Spider No. 3*—situated about three-quarters of a mile north-east of Long lake, which is the source of Cascade creek. They were owned by Bill Hamilton and Charlie Larsen, two "old-timers" of Stewart, and are now under option to W. A. Meloche. In the early spring the property was bonded by Trites & Wood, part owners in the *Premier* mine, who did a little development-work, but did not exercise their option. I have not been on the claims, but I understand from the owners and others that some very high-grade silver ore was exposed with the small amount of work done. Mr. Meloche is now taking in supplies over the snow (February) and will commence development-work as soon as permissible.

Several claims were staked this season over the Long Lake divide on the Nass slope, and some high-grade samples of silver ore brought out, assays as high as 600 oz. silver to the ton being obtained. The owners went back late in the fall to build a cabin with the intention of staying in during the winter and developing their finds. It is significant that the same class of ores as in the Salmon valley are being found on the other side of the divide.

Silver Crest Mines, Ltd. This is a recently incorporated company formed to take over the *Silver Hill* group of claims, situated on the east side of Dillworth glacier. (*See* map.) The group contains eleven claims—*Idaho*, *September Frac.*, *Argentite*, *Polybacite*, *Proustite*, *Pyrargyrite*, *Stephanite*, *Native*, *Hessite*, *Cerargerite*, and *Stromeycrite*. In the absence of the owners I was unable to find the showings, but I understand that it was examined by P. W. Racey, on whose recommendation the incorporation was made for the purpose of acquiring and developing it. The capitalization is for 200,000 shares at 25 cents each.

Unicorn Group. Four claims—*Unity*, *Unicorn*, *Unicorn No. 2*, and *Unicorn No. 3*—compose this group. They are situated east of the upper claims of the *Big Missouri* group. The property has been under bond all summer to J. R. McDonald and considerable work done by way of stripping and open-cutting. Unfortunately the season's work was completed when I was on the property, and in the absence of any one familiar with the ground I did not find all the workings. In the cuts examined there was good-looking ore exposed and Mr. McDonald is enthusiastic with the values obtained. Extensive work is planned for next year, and an attempt may be made this winter to get a diamond-drill started.

Salmon River Mines Co., Ltd.—This company was organized in Victoria to acquire and develop the *Sunset* group, situated at the foot of Dilworth glacier, north of the *Unicorn* group. The property consists of two claims—*Sunset No. 1* and *Sunset No. 2*—staked this year and owned by Dalby Morkill and Bill Fillier.

Silver Tip Group.—This is an old group of claims consisting of *Silver Leaf*, *Bella Coola*, and *May P. J.*, now owned by J. V. Clegg, of Hyder, Alaska, and associates. There is a quartz-outcropping carrying about 8 inches of galena, in which were found high values in silver. A tunnel 40 feet long has been driven in on the vein from Silver creek, showing a little ore.

Montana Group.—This group lies between the *Forty-nine* and *Unicorn* groups and was staked early in the year by Bill Murphy and associates. I understand that a little work has been done on some promising surface showings.

Forty-nine Mining Co., Ltd. This company was incorporated in March of this year with a capitalization of $1,500,000 for 1,500,000 shares at $1 par value. The head office is 701 Rogers Building, Vancouver. Its holdings consist of the *Forty-nine* group of mineral claims located by Dan and Andy Lindeborg, from whom they were purchased by the company. The claims comprising the present group are nine in number—*Dickens*, *Darwin*, *Dumas*, *Chicago*, *Boston*, *Million Dollar Fraction*, *Yellowstone Fraction*, *Forty-nine*, and *Oxidental*. They are situated about twenty-three miles away from tide-water on the east side of Salmon glacier, and are reached by a continuation of the trail to the *Big Missouri* cabin, a distance of about three miles.

Considerable surface work had been done by the owners, who in the early days hauled their supplies on a sled from the beach, crossing the Salmon river at 9-Mile; then across the Texas Creek flat over the little divide to the foot of the Salmon glacier, and from there up over the glacier to the shore below the property, from which point the back-pack was used to the claims.

The first work was on the *Forty-nine* claim, on which an open-cut was run across a cropping for 20 feet, showing ore for that width, of which 8 feet was of better grade, but the whole averaging $3.20 in gold and 19 oz. silver to the ton. On the foot-wall of this vein there is a 25-foot dyke which must lie within the vein, as a later open-cut on its south side exposed an additional 6½ feet of ore, assaying 80 cents in gold and 65.6 oz. silver to the ton. This has always been considered the main vein.

Open-cuts above this cut exposed two smaller veins—one 2 feet wide assaying 72.6 oz. silver a ton, and another 10 feet wide assaying $1.20 in gold and 6 oz. silver to the ton.

South-west of the big cut a width of 20 feet of broken-up quartz has been exposed by an open-cut, from which sorted ore assayed $6.40 in gold and 29.8 oz. silver to the ton. There has been no work done any farther north, but the surface gives every reason to believe that extensive ore-bodies will be found when the ground is explored.

It will be seen from the above that the surface showings on the property look very promising. The present company did not get started until July owing to the lateness of the season, and credit is certainly due the energy of Harry Howson, manager; Vince Lade, in charge on the hill; and the Crawford Bros.' pack-train for the amount of work that had been accomplished by the middle of October. A two-story bunk and mess house, 16 x 52 feet, to accommodate fourteen men, and an assay office, 12 x 14 feet, has been built on the camp-site and a blacksmith-shop at the tunnel, all the lumber being packed on horses from the beach. A force of from eight to twelve men was maintained, and extra supplies for winter, including 200 cases of kerosene to be used for cooking and heating purposes, as no wood was available, were packed in.

A tunnel was started at an elevation of 4,100 feet, or about 100 feet above the camp, on the main vein exposed on the surface by the old cuts. This had been driven over 100 feet, cutting diagonally across a milling grade of ore in which are streaks of high grade. It is said that the grade of the ore has materially improved as the tunnel approached a point under the exposure on the surface. I have no doubt that there will be developed in this vein a big tonnage of milling-ore, with the probability of encountering shoots of shipping grade. A contract was let to Boyle Bros. for diamond-drilling this vein. They put a machine on the ground, but very little drilling was accomplished on account of insufficient power. It was unfortunate that this work could not have been carried out for the information it would have afforded in planning the underground work.

The surface has been systematically prospected and sampled all season and an assayer employed at the property. This work was successful in discovering a cropping of ore on the *Oxidental* claim, on which a tunnel had been driven about 30 feet, disclosing a quartz vein from 18 to 36 inches wide, lying in greenstone formation and carrying high values in silver sulphides. The vein has been traced on the surface for some distance above the tunnel, showing good values and size, and has every appearance of becoming a very valuable producer. Work is being pushed in both tunnels by a crew of from eight to fourteen men. The camp, notwithstanding the arctic appearance of its location, is proving to be most comfortable. The most detrimental feature to this property and the country north of it is, of course, lack of adequate transportation facilities. However, the improvement of the main pack-trail from the Salmon River wagon-road to the old cabin on the *Big Missouri* group, and the extension of it through to the *Forty-nine* camp, would be of the greatest benefit until such time as the wagon-road is continued through.

The country beyond the *Forty-nine* group has all been staked this year, and it is said that there are several showings worth investigation. The trail should be extended beyond the *Forty-nine* camp as far as it can be built.

Across the glacier a number of claims were staked all along the shore, and also along the north shore of the west branch of the glacier.

Yellowstone Group.

The three claims—*Yellowstone*, *Bute*, and *Old Timer*—comprising this group are situated west of the *Forty-nine* group and just above the glacier. They are owned by Bill Murphy, of Hyder, Alaska, and associates. This is one of the oldest groups in this section and has had considerable surface work done in open-cutting, stripping, and trenching, disclosing some very fine ore. It no doubt contains

the extension of the vein being opened up on the *Forty-nine* claim and has therefore about the same possibilities.

Hercules Mines, Ltd.

This property consists of five claims—*Glacier*, *Martha Ellen*, *Cornelius*, *Empire*, and *Leckie Fraction*—situated north of and adjoining the *Tip Top*, the end claim of the *Big Missouri* group. The trail to the *Forty-nine* crosses these claims. It was worked in 1910, the work consisting of several hundred feet of open-cutting, trenching, and shaft-sinking, which exposed a vein from 5 to 30 feet wide, lying in greenstone-schists and mineralized with galena and considerable chalcopyrite carrying gold and silver values. The croppings, at an elevation of 3,500 feet, have been traced for nearly 2,000 feet. The company's head office is in Vancouver, and I am reliably informed that work will be resumed on the property next summer.

Big Missouri Group.

This group consists of sixteen full claims and four fractions, extending along the east side of Salmon glacier for over two miles and about twenty miles from tide-water. It is one of the oldest groups in the section and was owned by Dan and Andy Lindeborg and the Stevenson and Proudfoot estates until bonded to the Pacific Coast Exploration Company, Limited, last year. The property has been described from year to year in the Minister of Mines' Report. It has been examined by many of the best mining engineers on the continent, and it is generally conceded that it contains one of the largest surface showings of ore in the country.

The work of the last two years has been on another portion of the property, the *E Pluribus* and *Laura* claims, adjoining the *Mineral Hill* group, on which there are some fine outcroppings of high-grade silver ore that extend on to the *Big Missouri* ground. On the *E. Pluribus* claim the showings have been extensively exposed on the surface by open-cutting and trenching, which have exposed very fine ore.

This year, under the supervision of C. F. Sturtevant, a substantial and comfortable camp was established on the *Joker* flat and further open-cutting and trenching done on a lower bench just above Silver creek. This surface work proved so encouraging that a tunnel was started on the east side of the creek for the purpose of undercutting the showings exposed. A blacksmith-shop, housing for a fan, and snow-shed over the track to the dump were built at the mouth of the tunnel. It had been driven 80 feet at the time I was on the property (October 18th), through greenstone-schist country-rock. This tunnel is being driven with two shifts this winter.

Diamond-drilling was started as early as possible with the object of determining the surface exposures at depth. In all, nine holes were drilled, aggregating 2,400 feet, on the south-east corner of the *E Pluribus* claim. Five of these holes were vertical from the top of the hill, where some high-grade ore cropped; one horizontal from the side of the hill; two flat holes and one vertical hole at the creek-level. While no information is available for publication, I may say that the results obtained have been sufficiently satisfactory to warrant further development on a comprehensive scale. To this end, camps will be erected on the *Province* claim next spring and an exhaustive investigation, by diamond or other drilling, made of the "big showing."

Experiments are being carried on with the complex ores of the "big showing" to work out, if possible, an economical separation and concentration process. When this is successful the *Big Missouri* will develop into one of the big producers of the continent, if surface showings can be taken as indicative of quantity and quality of ore. Next year's diamond-drilling will be of the utmost interest and importance to the Salmon River section.

The high-grade silver ores are now claiming all the attention, but the ultimate success and permanency of the section depend on the tonnage of milling-grade ore.

Mineral Hill Mines, Ltd.

This company, with its head office at Vancouver, has recently been incorporated with a capitalization of $2,500,000 for 2,500,000 shares to exploit the *Mineral Hill* group of claims. The company's holdings now consist of seven mineral claims—*Little Joker*, *Lookout*, *Mystery Fraction*, *Pass Fraction*, *Mineral Hill*, *Midas*, and *Midas Lake Fraction*—situated east of and adjoining the *E Pluribus* and *Laura* claims of the *Big Missouri* group. The property has been worked under bond for the past two years by Welch, Fetter, Carlton, and associates, of Seattle, Wash. Under the energetic supervision of Al. Harris a great amount of work has been done, consisting of numerous trenches and open-cuts on the surface and several hundred feet of underground work. The main tunnel has been driven about 400 feet and about 300 feet of crosscutting and drifting done. The surface work exposed several showings of silver ore rich in native silver and argentite. The tunnel was driven to get

under the more promising of these surface exposures, and although some high-grade ore was found, the general results did not fulfil expectation indicated on the surface. However, the work was satisfactory in that sufficient milling-grade ore was encountered to justify opening up the property on an extensive scale.

Several short tunnels were put in under the high-grade shoots nearer the surface, showing them to extend to that depth at least. The underground work shows some very interesting features, indicating two sets of filled and enriched fractures at right angles to each other.

Drifting on an east-and-west fracture, crossed in the second north crosscut, has disclosed a shoot of very fine ore. A drift east from the No. 1 north crosscut is also showing up some good ore.

The property, though well supplied for all winter work, was closed down the first of the New Year for the purpose of completing the organization of the company. Work will resume about May 1st, and an aggressive policy of equipment and exploration of the property may be expected for the future. The placing of the property on a producing basis is within sight, and it would be greatly benefited if adequate means of transportation were available.

Pay Roll Group. This group consists of two claims—*Pay Roll No. 3* and *Pay Roll No. 4*—owned by Bill Murphy, of Hyder, Alaska. They lie south of Noname lake and north of the claims of the Indian Mines Company, Limited. The property was under bond early in the year and some little work done in surface trenching, etc. This work proved unsatisfactory and the bond was not exercised.

Boundary Group. This group is owned by Dan McIntominey. The claims, four in number—*Boundary No. 1*, *Boundary No. 2*, *Boundary No. 4*, and *Missing Link Fraction*—are situated north-west of and adjoining the *Indian* group. A 40-foot tunnel and a series of open-cuts were driven in 1911 and the claims Crown-granted in 1913; no further work has been done since. A strong pyritized quartz vein was crosscut by the tunnel and traced for some distance on the surface. It carries some galena, but the whole was low grade. The size of the vein and encouraging values warrant further work.

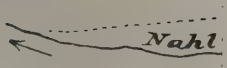
Indian Mines Co., Ltd. This property was reported on last year and no work has been done this season. This is one of the old prospects in this section, on which several hundred feet of underground work has been done, exposing ore-shoots which deserve further development. The face of the upper tunnel shows a width of 14 feet of ore, which is no doubt the downward continuation of the surface exposure on the top of the ridge. The vein can be traced to the upper limit of the claim, and altogether the property is worthy of more work: the tunnel seemingly was stopped just when it was opening up ore which may prove a valuable shoot. The registered office of the company is Prince Rupert and L. W. Patmore is secretary.

Woodbine and Kitchener.—These claims, belonging to Dave O'Leary and situated just above the forks of Cascade creek, on the west side, have been bonded to W. A. Meloche.

STIKINE MINING DIVISION.

This Division takes in the whole drainage area of the Stikine river and is accessible from the Coast by way of Wrangell, a port of call of the Canadian Pacific Railway Coast boats running through to Skagway, and from there up the Stikine by river-boats to Telegraph Creek. The southern end of the Division is traversed by the Iskut river, a tributary of the Stikine, which is navigable for small boats for about forty miles, and safely for the Stikine river-boats for about ten miles from its mouth. It has been pointed out in reports to the Dominion Government that the expenditure of about $25,000 in cleaning out the channel of snags and other debris would make it navigable for its full length to the canyon, about forty miles.

For the past two years there have been good transportation accommodations furnished by the Barrington Transportation Company up the Stikine river. A river-boat of 50-ton freight capacity and accommodation for twenty or twenty-five passengers leaves Wrangell each week, meeting the Canadian Pacific Railway boat from the south, and reaches Telegraph Creek in from two to three days, a distance of 160 miles, stopping at the Boundary each way, where there is a Mining Recorder's Sub-office. The fare from Wrangell, including meals, is $25 and freight rates $45 a ton through to Telegraph Creek, with proportionate charges for intermediate points. The return fare is less, as the down-trip is made in about twenty-four hours. Prospectors can have supplies


Nahl

Portions of Stikine – Liard Mining Divisions

Nahlin R.

Height of land

17 days to Teslin Lake Winter trail

Canyon Creek

Dease River

Eagle River

Rolling hills

Hastings Mt

McDame Creek

Mt Range

Rapid Cr.

Sylvester Mt 7000'

Sheep Mt 8100'

4 Mile

Defot Mt.

Porter

Berry Cr.

Thibert Creek

Adams Leases

Lease Cr.

French Mt

Partridge Mts

Dease Cr.

Mr Sullivan

Five Mile

Lake Dease Elev 2660' 126 Miles long

Mr McLeod 6300'

Four Mile Cr.

Peak

Hills

Tatsho Mt 7940

Low divide

Liard Division

Stikine Division

Tuya River

Trail

Rolling

Trail River valley 5 Miles wide

Peak

Tanzilla River winding in valley 5700

Tanzilla

Ho-tar-lu Mts

Low pass

Tahltan R.

Telegraph Creek

Glenora

Stikine

Stikine R.

Klastline R.

(Second South Fork)

Mess R.

(First South Fork)

N

Miles

To accompany report of G. A. Clothier 1919

B.C. Bureau of Mines

discharged at any desired point along the river, and when traffic warrants a side-trip of ten miles up the Iskut can be made, which will be a big help to prospectors going into that section of the country.

The Iskut river appears to be about the line of contact of the granite with interior rock formation. The south side of the river is apparently massive granite.

On the Stikine the Coast granites extend to the "big glacier" on the west side of the river, or possibly a little farther; beyond that, up the river near Glenora, where the basalt-flows appear, is within the Eastern Contact mineral-zone. There have been a few claims staked along the river, but the amount of prospecting done is negligible in such an extent of country. Telegraph Creek, the head of navigation, is the central point from which all the interior country in this Division is reached.

Clearwater River.

The Clearwater river flows into the Stikine from the west, about thirty-eight miles below Telegraph Creek or about ninety miles above the boundary-line. It is navigable for powerful gas-boats and small river-boats by poling and lining for a distance of thirty miles, and traverses a portion of the Eastern Contact Belt that should be worthy of any prospector's time.

The only work being done at present is by J. M. Jackson and partner, who are sluicing on a lease situated about a mile up the North fork, which joins the main river about eleven miles from its mouth. They have been working here for some years, prospecting along the creek on rim-rock wherever available and on the bars and benches. Their present work consists of dyking off about 200 feet in length along the creek and the installation of a pump. Everything was in readiness to take advantage of low water, when it would be possible to pump out the dyked-in portion, get down to bed-rock, and work into the bank toward the rim. The prospects they had found at the spot were very encouraging and they were very optimistic of a fair clean-up. No later information has been obtainable.

Some years ago Conover and Wilson (two "old-timers" who have lived about two miles above the mouth of Clearwater on the Stikine for about twenty years) and Jackson took out several thousand dollars from a low bench about half a mile below Jackson's diggings. The run of gold was practically on the surface, not more than 12 feet of depth being reached anywhere over an area 200 or 300 feet long and about 100 feet wide.

From the mouth of the main river up there are extensive bars and benches of river-gravel showing colours wherever panned, and which, I believe, would be well worth drill-testing for hydraulicking and dredging purposes. A drill could be landed from the river-boat anywhere near the mouth of the river or at Conover & Wilson's cabin and taken up the river in the winter without any difficulty. There is a fair trail from Conover's cabin, with the exception of a few stretches along the river-bank where it has been washed out by high water. The upper six or seven miles are along gravel benches and with a little brushing-out of the jack-pine growth would make a first-class wagon-road.

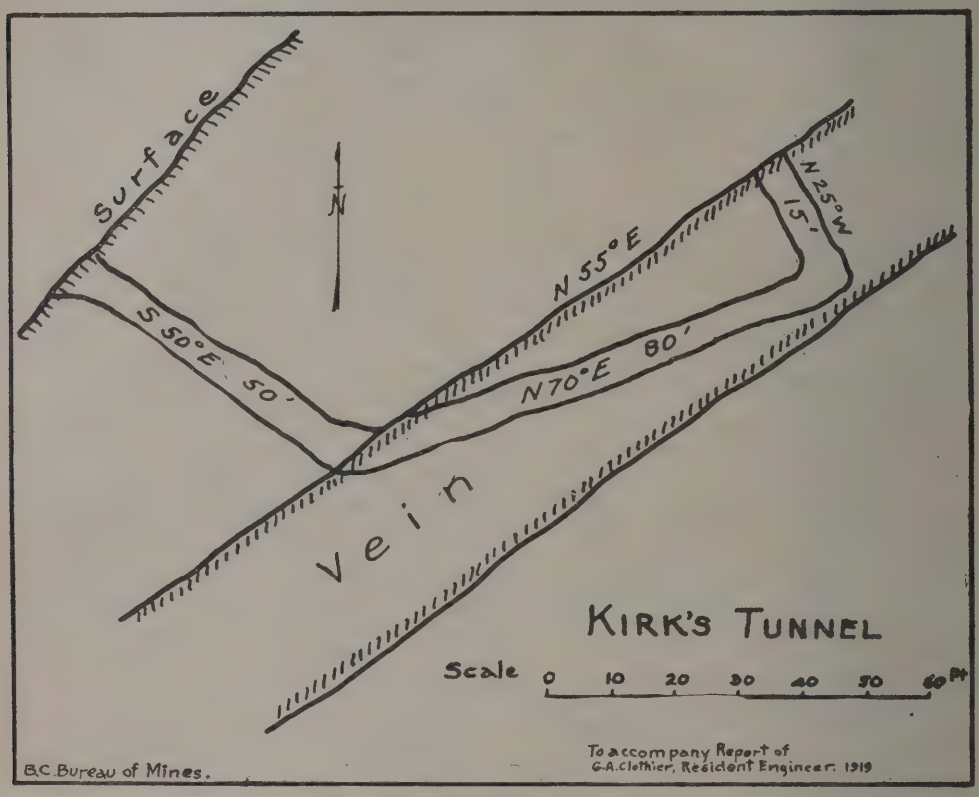
August.

This claim is owned by L. Kirk, who has a ranch on the east side of the Stikine just above the mouth of the Clearwater. Mr. Kirk is another "old-timer" along the Stikine and is deserving of much credit for the fine little ranch he has cleared and under cultivation. The mineral claim is situated on the mountain-side about two miles from the ranch, from which there is a first-class foot-trail built by the owner. The camp on the claim is at an elevation of 2,900 feet, and the owner, who is well over seventy years of age, has certainly accomplished a very creditable amount of work alone. At an elevation of 3,175 feet a tunnel has been driven of 145 feet in length. (*See* sketch.) The first 50 feet is driven through a dioritic-looking igneous rock, encountering the vein or mineralized belt, which appears to be a brownish, altered and silicified, igneous rock, somewhat porphyritic. Throughout the vein matrix are small veinlets of quartz carrying bornite and chalcopyrite. The tunnel turns to the left and cuts diagonally across this belt for 80 feet at a small angle, and from that point turns again to the left, back across the vein for 15 feet to the wall, on a bearing of N. 25° W. The vein strikes N. 55° E. It is about 15 feet wide on the surface and is evidently of average low grade, probably from 2 to 4 per cent. copper.

Below the tunnel there is a similar zone from 40 to 50 feet in width, in which are stringers and veins of quartz up to a foot wide, well mineralized with bornite and chalcopyrite. There is another outcropping, north of the one under which the tunnel has been driven, at an elevation of 3,475 feet, from 2 to 6 feet wide, striking north and south and dipping from 60 to 65 degrees to

the east. This zone or vein is more silicified and consequently better mineralized than the other showings. The continuation of the crosscut portion of the tunnel would probably encounter this.

I doubt if any appreciable amount of shipping-ore could be produced by hand-sorting, but so far as can be seen there is sufficient bornite to make a high-grade copper concentrate, but it



would require extensive exploration-work to ascertain if there is sufficient tonnage of milling-grade ore to justify a concentrator. Mining and milling conditions are good and transportation would not be a detriment.

Mountain Goat. This claim also belongs to Mr. Kirk. It is situated about six miles north of the *August* claim, at about the same elevation. There is a good trail to it from the ranch. The owner states that there are two or three parallel veins similar to those on the *August*.

Stikine Group. This group consists of at least the four claims—*Stikine Nos. 1, 2, 3,* and *4*—owned by Tervo & Bodell, and possibly the two claims—*Tonopah* and *Vesuvius*—owned by Pete Hamlin. The claims are situated at the Devil's Elbow, about four miles below Frank Jackson's ranch at Grand Rapids. The group was under option in 1915 to the Stikine Mining Company, a company formed by Sam Silverman. Considerable work was done on them at that time, consisting of three tunnels; good camps were built at an elevation of 1,900 feet, to which there was a good trail from the cabin on the river at the foot of the rapids.

At an elevation of 2,200 feet the upper tunnel was driven in about 30 feet on the foot-wall of a limestone-belt which showed a width of from 20 to 25 feet at the mouth of the tunnel, overlying a slaty formation. On the foot-wall of the limestone it has been somewhat altered to an epidote, in which occur bunches of zinc-blende. In the tunnel the limestone has been gouged out in every direction, apparently following these zinc bunches. The lime-belt strikes N. 50° W. and dips S. 30° toward the river. Below this tunnel the surface has been open-cut, following along the foot-wall of the limestone, and here showing some zinc and stained with copper. Another tunnel, 2,140 feet elevation, was driven 70 feet across a mixed slate and limestone formation. There is no mineral showing in this tunnel. At 2,100 feet elevation the lowest tunnel was driven 300 feet, following some calcite and quartz seams, in which occasionally

occurs a little zinc-blende lying in a slate formation. No indications of any appreciable mineralization in this tunnel. Altogether the showings do not hold out much encouragement.

Vesuvius. This claim, owned by Peter Hamlin, is north of and adjoining the *Tonopah*. A small open-cut on the top of the hill at an elevation of 3,375 feet exposes a length of 6 feet and a face of about 6 feet, in which there is about a foot of quartz well mineralized with galena and zinc. A little farther along another cut shows a small vein of zinc-blende associated with a diorite dyke, and also showing hornblende, epidote, and actinolite, and is therefore probably an altered portion of the dyke. There is a little chalcopyrite exposed here.

Grey Bird. This claim is owned by Frank Jackson and Walter Vivian, of Telegraph Creek. On the top of the hill, at an elevation of 3,550 feet and north of the *Vesuvius* claim, there are widely distributed outcroppings of pyrrhotite, with a little chalcopyrite scattered through it. In an area of 200 or 300 feet square there are several croppings lying in a greenish igneous rock, probably diorite. No work has been done, and as the surface is heavily oxidized the nature of the ore underneath could not be ascertained. The owners claim to have obtained an assay of 48 oz. silver a ton across several feet. The extent of the croppings are very favourable-looking and some depth should be obtained to get into the solid. Sinking would have to be done as the surface is almost flat, though 50 feet depth could be obtained by a 100-foot tunnel at one point. The claim is favourably located, overlooking the river, which could be reached with a short tramway. I would recommend some exploratory work.

There is a group of claims up 4-Mile creek, four miles below Telegraph Creek, on which the owner, Guy Carson, was doing some work, but having no guide on my trip down the river I was unable to find the property.

Iskut River Section.

This area consists of about thirty or forty miles along the Iskut river, for the greater part in the Eastern Contact Belt. The Stikine boat got up thirty-six miles with me, but the risk is so great on the return trip that the present cost is prohibitive. With the exception of two groups staked thirty-six miles up, there has been practically no prospecting done in this section.

Iskut Mining Co. This company was incorporated about ten years ago and has its head office in Wrangell, Alaska. Its holdings consist of two groups of claims, Crown-granted, situated on Johnny mountain, about thirty-six miles up the Iskut river. The upper claims, known as the *Iskoot* group, are the *El Ora*, *Golden Pheasant*, *Iskoot*, *Margurritte*, *Copper Queen*, *Silver King*, *Brown Bear*, *Silver Dollar*, and *Blue Grouse*. The lower claims, the *Red Bluff* group, are the *Red Bird*, *Katherine Frac.*, *Red Bluff*, *Homestake*, and *Mermaid*.

The rock formation in the comparatively small area I was able to cover in the short time at my disposal is predominantly greenstone, in which broad bands or belts of it have altered to schists and have become silicified and pyritized. There are also belts of slates and intrusions of spurs and masses of granite, all very similar to the areas at the heads of Alice arm and Portland canal, except that the different formations here appear to have a more definite trend, of nearly east and west.

On the upper group, at an elevation of 2,100 feet, an open-cut has been run in a greenstone-schist, in which are seams and small veins of quartz mineralized with pyrite and chalcopyrite, and small veinlets of solid sulphides occurring mainly in the decomposed seams. About a ton of chalcopyrite ore was sorted from this cut and shipped several years ago, giving returns of $1.20 in gold, 44.2 oz. silver, and 12.45 per cent. copper to the ton.

Traces of argentite are found associated with the sulphides, accounting for the high silver values in some of the samples taken by the owners. Across the exposed mineralized width of 3 or 4 feet the total ore content would be about 6 inches; the sulphide seams are not continuous, but rather are small lenses lying along the planes of the schist. The general strike of the schist is about N. 70° E. About 50 feet north of this cut another was driven into the vein, which here shows a little chalcopyrite. South of these another trench has been made along the side-hill for 75 feet, uncovering the vein, but no depth was obtained. A little chalcopyrite is showing. This mineral-belt might develop a tonnage of commercial ore with further work.

Down the hill from these showings the greenish schists gradually blend into a white chloritic schist fairly well pyritized with disseminated small grains. This belt is about 800 feet

wide and carries traces of gold wherever sampled. No work has been done on it. Basaltic dykes cut the formation at almost right angles, S. 10° E., into the hill.

The *Red Bluff* group is staked to include an immense outstanding red bluff, of which about 800 feet of a straight wall is exposed. This vein where uncovered farther along the side-hill gave assay returns of a low percentage of copper and a trace of gold and silver across 30 feet. The amount of work done altogether is totally inadequate to form any opinion as to the possibilities of the property, only showing that there are mineral-belts worth prospecting.

From an elevation of about 4,000 feet the course of the South fork of the Iskut could be seen for about ten miles, running in a south-easterly direction and apparently flanked on its west side with granite. I judge that a trail ten miles up the South fork would be within twenty-five miles of the head of the Unuk river. The South fork looks as if it would be navigable for poling boats for about ten miles, and even without a trail toward the Unuk there is an immense area already accessible for prospecting along this fork and the main Iskut.

LIARD MINING DIVISION.

This Division comprises the north-eastern part of the Province and is the drainage-basin of the Liard river, which empties into the Mackenzie river at Fort Simpson. Practically little is known of the area, with the exception of the western corner of it around Dease lake and along the Dease river, which drains the lake and flows into the Liard river.

Several million dollars in placer gold were produced from this section in the early days, from 1873, principally from Dease and Thibert creeks, emptying into Dease lake, and McDame creek, flowing into Dease river fifty-five miles below the lake. Numerous other small creeks yielded good returns for a short time. Official records show that the gold-output from 1874 to 1887 totalled about $5,000,000. In several places the gold found was very rough and contained in quartz, suggesting possibilities of rich gold veins. Taking into consideration the extent of country in which gold has been found, it must be admitted that there has been practically no prospecting done. The greater part of the country was hurriedly run over by the early-day placer-miners in search of rich diggings, and it would therefore seem reasonable to suppose that there is much ground that has never been prospected at depth, which could be done by later-day methods, with hydraulicking and dredging operations in view.

There are promising coal-croppings on the Tahltan and Tuya rivers and natural-gas and oil seepages are reported from the lower Dease river and Liard river. The Dease river is navigable for gas-boats from the lake to the Liard.

Dease lake is reached by way of Telegraph Creek, from which there is a first-class pack-trail, improved into a wagon-road for twenty-five miles, to the head of the lake, a total distance of seventy-two miles. A pack-train leaves Telegraph Creek every five days, freighting to the lake for 7 cents a pound. From the lake there is a big scope of country accessible for prospecting. The country is full of game and is the mecca for an increasing number of big-game hunters every year.

The Government Agent at Telegraph Creek, H. W. Dodd, is exceptionally well informed on all parts of the country, from the boundary on the Stikine to the Liard river.

The success of this year's operations on Thibert creek has revived interest in this section and a considerable amount of prospecting is looked for next season. Many of the old leases on the three principal creeks—Dease, Thibert, and McDame—which have not been worked for years, have been cancelled by the Minister of Mines this fall and the ground again made available for new blood. A number of leases have been staked and applied for this summer.

On Dease creek, flowing into Dease lake at the old camp of Laketon, two or three placer-miners were operating in a small way about six miles up the creek. The extensive flat at the mouth of the creek shows evidences of early-day placer-mining. This ground was tested in 1913 and 1914 by drilling, and I am informed that satisfactory results were obtained. This ground might pay to dredge, although the absence of a bed-rock some distance out from the mouth of the creek might be a serious detriment. The flats at the mouths of Thibert and McDame creeks have also been drilled and paying values reported.

On Thibert creek the most important work of the season was carried on. This creek empties into the foot of the lake below Porter. Since about 1900 the Thibert Creek Mining Company has been operating a hydraulic plant on its leases about six miles up, producing from

$10,000 to $25,000 a year, of which very little was profits because of the heavy cost of operating. Two years ago the plant was closed down and the work abandoned as unprofitable.

This spring George Adams, an Atlin operator, secured an option on the plant and ground and commenced operations under very unfavourable conditions; a portion of the flume had been taken out by a mud-slide, sluice-boxes had been buried, etc., and labour very scarce. However, the flume was repaired and a monitor started to dig out the sluice-boxes, which, when uncovered, had to be moved a couple of hundred feet to the piece of bed-rock that the old company was about to clean up when the flume went out. This was expected to yield good returns, but proved to be discouragingly poor, giving only about 40 oz. of gold. The season was getting pretty well along, but it was decided to try to take another pit out farther into the hill, believing that the old channel was farther back. This entailed a lot of work in moving a bank of gravel 200 or 300 feet high; however, in twenty-two days a strip about 150 feet long and 20 feet wide had been stripped and cleaned up, yielding about $14,000 in coarse, well-worn gold. There was an appreciable amount of platinum with the gold. Mr. Adams is naturally very optimistic and is planning extensive alterations and improvements in the plant for next year.

The trail from Telegraph Creek to the lake should be improved to a winter road by cutting down some of the steep grades, widening in places where high banks have filled it in, and repairing the bridges that would be required in winter. This would provide adequate transportation for drills, pipe, machinery, and supplies of all kinds for prospecting and operating.

Deloire creek flows into Thibert creek about three miles from the mouth. The principal work done on this creek was by the Mitchell Bros., who owned two leases near the mouth. Considerable gold had been recovered by them from the rims and bars, and in 1907 a steam pumping outfit was taken in and a shaft sunk 25 feet to bed-rock, where coarse gold was found in paying quantities. From the shaft a crosscut had been driven across the channel a distance of 40 feet in good pay-dirt, when the whole workings caved in. Since that time bed-rock has never been reached. This fall Captain Barrington and associates secured these leases and staked others above them, and this winter have two men testing the ground by drilling. No report is available as to the results of this work, but if the test proves satisfactory a plant will be installed in the spring.

On Mosquito creek, flowing into Thibert from the north, about twelve miles up from its mouth, George Adsit has held and worked a lease for a number of years. Good "pay" has been found, but the work done has necessarily been small with only one man operating. Some platinum has also been found here.

Three leases have been taken up above Adsit's, on Mosquito creek, and one on Defoe creek, which heads near the head of Mosquito creek and flows into Canyon creek, which empties into Dease river.

There is a good trail, a wagon-road part way, from Porter to Adams's camp, and an old trail from there on up the creek to Adsit's. From Adams's camp up, the trail should be put in better shape to enable prospectors to get supplies up Thibert and its tributaries and across to the head of Canyon creek.

I did not get down to McDame creek, but I understand that there is some good ground there well worth testing for dredging or hydraulicking. A few men were prospecting on the creek this year. A number of mineral claims were staked on Haskins mountain on the north side of McDame creek several years ago, but no amount of exploratory work was done on any of them. Some claims were also staked on the First South fork several years ago.

Since in the early placer days the prospecting was all superficial, I believe it would be a profitable investment to test many of the creeks by drilling to bed-rock. The country is comparatively easy to get over, and a light Empire drilling outfit could be handled to good advantage by three or four men. A season's prospecting might be done in advance and the more promising creeks selected for drilling.

SMELTER.

A smelter in the vicinity of Prince Rupert, or anywhere along the north-western Coast, has been under discussion for the past two or three years. During that time the only class of smelter thought of was a copper-furnace since that was the predominating class of ore produced in this north-western district. However, the fact of having the Granby smelter at Anyox for the treatment of custom copper ores, and also that the Ladysmith copper plant has been unable to secure

sufficient copper ore to maintain steady operation, has precluded the advisability of erecting another landmark in the shape of a smelter.

Attention was given the possibility of the installation of a lead-stack, but the lack of silver ores and the improbability of the country developing and producing a sufficient tonnage of this class of ore has heretofore never justified even the possibility of a lead-stack.

However, in the light of the extraordinary development of the mining industry during the past years and the extremely bright and favourable prospects for its continued growth, the time, I believe, is now opportune for the consideration of the erection of a lead-stack at some point most convenient for its requirements.

I think that an investigation of the ore probabilities, rail and water transportation, and water and power requirements would result in the installation of such a plant.

On Dean channel several iron claims have been staked by Filip Jacobson and arrangements made for mining and shipping the ore to the Smelters Steel Company, of Seattle. This company has erected a smelting plant at Seattle, in which the electric process will be utilized to reduce the magnetite ore to soft-grade iron or alloys steel castings, as may be desired.

About 1,200 tons has already been shipped, and equipment is being installed at the property on Dean channel to provide for continuous shipment.

This looks like a good start in the right direction, and should it prove successful every inducement should be offered by the Province for the installation of a similar plant at the most advantageous point along the Coast.

ATLIN MINING DIVISION.

I did not have time to get over any portion of this Division this year and am indebted to the Gold Commissioner at Atlin, J. A. Fraser, for the following outline of the mining situation in that section for the year and for the output from the different creeks.

Placer-mining has been carried on on a smaller scale than ever before, and the estimated total production will be about $160,000, as against $175,000 for last year.

In lode-mining nothing has been done on any of the properties other than the necessary yearly assessment-work, except on Fourth of July creek, where J. M. Ruffner has been investigating some claims owned by the late Thomas Vaughan. Several additional claims were staked, and I understand that Mr. Ruffner will endeavour this winter to interest sufficient capital to commence exploratory work in the coming spring.

No work of any note has been done on the *Engineer* mine, and owing to the many complications encountered in adjusting the affairs of the late Captain Alexander, the resumption of operations on this property at an early date is problematical. The property was described in detail in the Minister of Mines' Report of 1917. It is regrettable that this, seemingly the only property in the Division, cannot be brought into production operations and so provide a stimulant to the present stagnant mining conditions in that portion of the Province.

Spruce Creek.

On this creek there were only four main operators throughout the season and not more than twenty-five men employed.

I. Matthews and laymen were the principal producers, their output being about $25,000, or about 50 per cent. of former years.

Smith, Conroy & Carlson, working a total of six men, have had a very successful season, their returns being $12,104 for about six weeks' work. They are very optimistic for next season's output.

Otto Miller and partners took out about $4,700. Koppacher & MacPherson secured about $500. A. Grier, prospecting on Wilson creek, took out $250. Hodges and partner, prospecting on Wright creek, produced about $1,200.

Pine Creek.

There were several laymen on the holdings of the Discovery Mining and Power Company, Limited, who secured fair returns in places. Strom & Burger, employing twenty men, cleaned up about $13,600 in one place, $9,000 in another, and about $800 in another. Auld & McLaren, laymen, took out $3,300 in drifting.

Boulder Creek.

Fair returns were obtained from this creek for the length of the season and the number of men employed, the total output being approximately $35,000, as follows: The ground owned by Charles Miller was worked under three lays, Anderson and partners cleaning up $22,000 drifting; Rasmussen and partners cleaned up about $1,600 hydraulicking; Sands and partners cleaned up $2,600 in drifting.

On other parts of the creek Carlson and partners took out $1,610; Black and partners, $2,000; and Gus Anderson, $5,000.

Ruby Creek.

The Placer Gold Mines Company, the only operators on this creek, encountered serious difficulties toward the end of the season. The pay-shoot has evidently been thrown to the west by a high bed-rock, and at this point has been covered by a basalt-flow, making it impossible for hydraulic operations. This volcanic flow can be seen lower down the creek along the rims, but I understand it did not interfere with the gold run or operations at that point. The whole plant has been moved up the creek beyond that basalt-flow and preparations made to commence operations at that point. The company's output this year, employing about seventeen men, was in the neighbourhood of $40,000. Laymen are now engaged in drifting under the basalt, following the "pay."

On Otter creek work was continued throughout the season by the Mines d'Otter Creek Company and about $5,500 recovered.

On Birch creek Mr. Pearce again worked on the leases on which he has had a "lay" for a number of years. Conditions on this creek, so far as water is concerned, are very adverse. The clean-up this year amounted to only $1,860, but I am informed that the apparent location of the "pay" in the west bank has greatly added to the prospects for success for next year.

On O'Donnel river a few men operated for a short time, with very satisfactory results for the time worked. White and partners took out about $3,900.

Prospecting was done on several creeks, notably Slate, Lincoln, portions of O'Donnel river, and Wilson creek, from which little or no gold was obtained.

It is to be hoped that the property on Fourth of July creek will develop into a producing property and that the *Engineer* mine will in the near future be operated on a scale proportionate to the value and extent of its showing.

CASSIAR DISTRICT.

ATLIN MINING DIVISION.

REPORT BY J. A. FRASER, GOLD COMMISSIONER.

I have the honour to submit my report on mining operations in the Atlin Mining Division of Cassiar District for the year ending December 31st, 1919.

This was another lean year from the standpoint of production, with about the smallest number of men producing since there has been any gold production here; but there were more men prospecting in various directions than for some years past, and I have no doubt the results of their efforts in that direction will be apparent in coming seasons, and thus compensate for the present minimized production. At the same time, there was about the smallest aggregation of people in the camp, all told (not including tourists), in or for any season yet, so that the results taken from every standpoint may still bear favourable comparison with some bygone seasons.

There was a falling-off in the aggregate amount of gold reported, but only a very small difference between the amount of revenue received therefrom in 1919 and in 1918. The revenue from all sources in 1919 was only $130 less than in 1918, and were it not for the early and persistent blockade in the matter of mail transportation, which prevented certain remittances arriving here before the end of the year, 1919 would have made a considerably better showing than did 1918, but the returns for 1920 will be enhanced in consequence.

The period between "high water" and the "freeze-up" was one of the shortest on record on some of the creeks.

McKEE CREEK.

Taking the creeks in the same order as for some years past, I may say that on McKee creek nothing was done this season beyond protecting the plant and workings during high water. There is some reorganization being attempted apparently, but just what is contemplated has not yet been made public and in the meantime the works are idle.

PINE CREEK.

On Pine creek from twelve to sixteen laymen operated throughout the season upon the *Eastern* group and other leases held by the Discovery Mining and Power Company, Limited (formerly the Pine Creek Power Company, Limited, and associated companies' holdings), with very satisfactory results in some parts and with rather indifferent results in other parts, but, on the whole, with reasonably gratifying results and returns.

On the *Queen* leases, above Discovery, a small crew of laymen operated throughout the season and secured fair returns.

Some drifting operations were carried on by the Atlin Gold Mines Company, but again the manager has failed to respond to the usual request for a report as to the season's operations, and I am therefore unable to report with any confidence as to the results.

A number of miners have been reprospecting ground on this creek and are doing so this winter, so that next season it may be possible to report renewed activity on Pine creek.

SPRUCE CREEK.

This creek still led in the matter of production, although the output was not quite up to that of 1918.

On the *Lovell* group of leases Isaac Matthews carried on partly through laymen and partly by personally conducted operations, which were more or less of an exploratory character, but the operating force, all told, was smaller than for some years and the output correspondingly less.

On the *Shovel* group of placer claims Smith, Conroy & Carlson, with from three to seven and an average of six men, operated by ordinary individual sluicing methods from August 12th to October 7th and recovered over $12,000, which seemed like a recurrence of old-time experiences

Thibert Creek, Liard M.D.

American Creek, looking down from Mountain Boy.

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on this creek. They were operating in ground which for various reasons they were compelled to pass over in the past, and also resluicing tailings dumped upon their ground in bygone seasons. They expect to continue and to do better next season.

On the *Chicago Bill* claim Otto Miller and partners operated throughout the season and secured satisfactory returns.

On the *Peterboro* lease, on *Discovery* claim, and upon a number of other properties crews in varying numbers operated throughout the season, with satisfactory results in most cases, but as I have not had individual reports I am unable to particularize.

A few men operated above Discovery and at and near Blue canyon, but nothing worthy of special notice has been reported.

There were about sixty-five people on Spruce creek during the summer and about the same number are there this winter, and nearly all are engaged in drift-mining.

Birch Creek.

On this creek H. Peplow Pearse, with a crew of five men, commenced operations on June 24th and closed down on or about October 3rd on account of frost, making an exceedingly short operating season.

The lateness of the season's opening on account of frost retarded operations, and also the peculiar situation in which they found themselves on account of local conditions suggested the wisdom of not attempting any mining until after the high water had come and gone. High-water mark was reached on June 27th, and in order to protect dams, etc., no gravel was sluiced until it began to wane, which it did rapidly until from the end of July forward it was very low until the "freeze-up" put an end to sluicing operations, as already said, about October 3rd.

In the short working season at their disposal, however, they succeeded in creating a new reservoir about 2,000 feet farther up-stream (whence an additional head of about 140 feet was secured) and in moving and relaying their pipe-line from their works up to this point, and while they did not succeed in removing as much gravel as usual, they had the satisfaction of working into better "pay" than they have seen for four seasons, the last two pits being in paying ground; and they are consequently very sanguine and optimistic as to the results of the coming season's operations, from which they hope to recoup themselves for much (if not all) of the loss experienced during the last four years, and incidentally to demonstrate the existence of pay-gravel which will justify a number of seasons' continued operations.

Boulder Creek.

On Boulder creek from twenty-five to thirty men were operating throughout the season.

On lower Boulder creek Charles Miller had three sets of laymen at work; one gang of three or four men was working hydraulically, whilst the other two crews—one of seven to twelve men and the other of from two to five men—were drifting and hoisting. I have not received any report from the manager, but I believe some of the ground operated was very good, while some other parts gave rather unsatisfactory returns.

Next above Miller was Gus Anderson, who with a force of from two to six and an average of three men operated from May 19th to October 27th, with very satisfactory results indeed.

On upper Boulder creek J. H. Black and partners operated hydraulically from about the middle of May to October 7th, with fair returns for part of the season, but it took them longer than was anticipated to get through and away from the lean ground encountered in 1918, so that the results of the season's operations were not up to those of some former years. They are still hopeful for the future. About a dozen men are drifting on the creek this winter.

Ruby Creek.

On Ruby creek T. M. Daulton, manager for the Placer Gold Mines Company, commenced operations on May 1st, and with a force of from sixteen to nineteen and an average of seventeen men continued until early in October. During the period of operation they moved up-stream 325 feet on the left limit and 110 feet on the right, making an average advance of 217 feet the full width of the creek, and in so doing handled nearly 53,000 cubic yards of gravel, from which the usual gratifying results were obtained.

Near the upper end of the area covered by this season's operations a bank of basalt from 200 to 300 feet in height, which overlies the pay-gravel, was encountered intruding from the

right limit, but which it was deemed advisable not to undermine because of the danger to life and plant. The entire plant was therefore moved to a point above this basalt intrusion just before closing down, so that they can commence operations next season above it and continue on until bed-rock is again encountered. A small force of men is drifting on that ground this winter and recovering very good "pay." I understand they are drifting out the gravel underlying the basalt. From seven to twelve people are wintering on the creek.

No report has been received as to the results of development-work on Volcanic, Cracker, Granite, Horse, or Hemlock creeks, although there has been more or less work done on the first three mentioned at least, and they are all regarded locally as being probable producers eventually.

WRIGHT CREEK.

On Wright creek four men were employed throughout the season, but mostly upon dead-work, the benefit of which they expect to enjoy next season.

OTTER CREEK.

On Otter creek the Mines d'Otter, with J. E. Moran as foreman and H. Maluin as general manager, commenced operations on May 1st and continued until November 1st, and expended about $16,000 in a continued effort to hydraulic their way down to the solid bed-rock, upon which the pay-gravel lies from which they expect to be recouped for all their outlay and to secure a substantial profit as well.

This season's operations were mostly confined to widening the channel paralleling last season's operations, in order to determine its full width and also to recover the gold known to exist in the gravel overlying a stratum of hard-pan which acted as a sort of false bed-rock, and from which a certain quantity of gold has always been recoverable. The width of the channel was found to be a little under 200 feet. In widening this channel it was necessary to remove an overburden about 140 feet in depth, and in doing so a considerable deposit of glacial mud and clay was encountered which was absolutely barren, but which it was deemed necessary to remove to attain the desired information and results. About 220,000 cubic yards of material was thus removed to get down to the gravel.

A comparatively small quantity of gold was recovered this year, and consequently a deficit of nearly $10,000 was experienced, but they had the satisfaction of finding an increasing quantity of gold near the upper end of their pit, which appeared to increase as they advanced, and also to find the hard-pan bed-rock (so called) giving place to hard (genuine) bed-rock, and the apparent association of the increasing quantity of gold with the appearance of the hard (genuine) bed-rock encourages the hope and belief that next season will see them properly installed at last upon the real bed-rock of the creek, and that they may find the rich "pay" which is confidently believed to exist thereon.

Other work undertaken during the season consisted in part of the repairing and reriffling of about 2,500 feet (lineal) of sluice-flume; the dismantling, removing, and relaying of about 1,000 feet of pipe-line; extending the Wright Creek water-supply ditch about 1,200 feet; strengthening the reservoir dam on the *Paris* lease, etc.

The force employed throughout the season varied from six to ten men, with an average of eight men, and the wages paid were on a basis of $7 a day.

This company certainly deserves success and encouragement for its tenacity and manifest faith in the potentialities of the creek, and it is to be hoped next season will afford it the relief and reward which it anticipates.

Nothing beyond a little "sniping" was done on upper Otter creek this season.

LINCOLN CREEK.

On this creek a small force of men operated for a portion of the season, endeavouring to reach bed-rock, but on account of certain unexpected contingencies they were compelled to suspend operations before the end of the season. Amongst other obstacles with which they had to contend was the fact that their plant was inadequate to handle the quantity of water encountered in their prospecting-shaft, and before they were able to install the necessary plant winter set in and they were compelled to close down.

This creek has all the characteristics of a successful hydraulic proposition, except that the existence of gold in paying quantities has not yet been fully demonstrated, but even the modest

amount of work already done has disclosed sufficient evidence of the presence of gold in the gravels to encourage the owners to believe that proper exploration will reveal its presence in paying quantities and will add another good one to the list of our producing creeks.

WILSON CREEK.

On Wilson creek Andy Grier was prospecting upon his lease, the *Yellow Demon* (No. 558), from April 1st until October 16th, during which time he installed an hydraulic plant and operated it for about eighty days, chiefly prospecting.

Some prospecting is being done on the creek this winter and I expect considerable activity there next season.

SLATE CREEK.

On Slate creek a few men continued prospecting throughout the season, but do not appear to have secured anything very tangible; but with commendable pluck and determination they intend continuing their operations until they discover whether or not there really is "pay" on the creek, or, at any rate, on that portion of it.

O'DONNEL RIVER.

On this stream two or three men prospected throughout the season at the mouth of Feather creek, but I have had no report as to results.

On the *Gold Hill No. 3* bench lease a crew of five or six men operated for a portion of the season and secured very good returns for the time they were actually operating, and I understand it is intended to continue those operations next season.

Arrangements are being made this winter for systematic development on O'Donnel next season, and on other streams also, which have been idle for some time, so that increased activity and production may reasonably be expected.

BURDETTE CREEK.

Prospecting operations are in progress on Burdette creek this winter and on other outlying creeks, so that altogether a more hopeful feeling exists.

No new strikes have been reported.

MINERAL CLAIMS.

Not much apart from the necessary assessment-work to protect titles appears to have been done throughout the district this year, but more attention has been given to prospecting than for several years past, and there appears to have been more inquiry with respect to such properties on behalf of would-be purchasers than for some time past.

Some properties have been bonded and others are under consideration, all of which indicates renewed interest in that class of property and probable activity in the near future, but I am unable to definitely state more than this at present.

With respect to the *Engineer* mine, nothing has been done this year because of the unsettled state of affairs consequent upon the sudden death of the recorded owner last year, but an administrator has been appointed, and such progress as was possible under the circumstances has been made in the matter of adjustment, and it is probable this property will be in active operation again before the end of next season.

The *Maid-of-Erin* and associate properties in Rainy Hollow have been bonded to the representatives of strong capitalistic interests, and it is confidently expected that active development upon the properties will be commenced as early next season as climatic conditions will permit, and as the people interested contemplate the construction of comprehensive transportation lines and schemes the outlook for much activity in this camp is decidedly promising.

The silver-lead properties and deposits situated on Crater and Fourth of July creeks have received a more exhaustive examination during the past season than ever before in all probability, and as a result a number of new claims have been located, and the whole (new and old), with few exceptions, have been optioned to prospective purchasers who are even now considering ways and means of development, and it is expected that the coming season will witness the inception of active development upon those properties also, which will all contribute to the introduction of a new era into this camp.

I may say that some of the material found in one mineral-deposit near Atlin is now under investigation with a view to ascertaining what percentage (if any) it possesses of the latest and best steel-hardening material ever discovered.

Nothing was done towards the development of the coal-deposits in the district, nor of the hydromagnesite-deposits, although the latter are still under investigation by scientists and would-be purchasers. The question and cost of transportation is the principal deterrent.

OFFICE STATISTICS—ATLIN MINING DIVISION.

Free miners' certificates issued (individual)	329
Free miners' certificates issued (company)	4
Placer records issued	3
Placer rerecords (representing 205 claims)	192
Leases located and applied for	2
Leases issued	..
Leaves of absence (representing 104 claims)	30
Filings	1
Bills of sale, etc. (placer)	15
Bills of sale, etc. (hydraulic)	21
Bills of sale, etc. (mineral)	7
Mineral records	26
Certificates of work	93
Filings	8
Certificates of improvements	15
Crown grants issued	13
Gold reported (individuals)	$ 98,942 00
Gold reported (companies)	69,487 00
Total	$168,429 00
Royalty paid (individuals)	$ 1,363 70
Royalty paid (companies)	1,612 75
Total	$ 2,976 45

Revenue.

Land revenue	$ 2 00
Water revenue (rentals)	132 60
Free miners' certificates (individual)	1,561 75
Free miners' certificates (company)	600 00
Mining receipts (lease rentals)	1,100 00
Mining receipts (lease applications)	40 00
Mining receipts (other sources)	2,045 30
Mineral-tax (royalty)	2,976 45
Receipts from all other sources	12,650 01
Total	$21,108 11

STIKINE AND LIARD MINING DIVISIONS.

Report by H. W. Dodd, Gold Commissioner.

I have the honour to submit the annual report on mining operations in the Stikine and Liard Mining Divisions of Cassiar District for the year ending December 31st, 1919.

The past year has shown a marked increase in mining activity, and it is safe to assume that the coming season will see more development on placer-diggings than has taken place since the early days of the Cassiar.

On Thibert creek Geo. Adams, of Atlin, has taken over the seven hydraulic leases of the Dease Syndicate (formerly the Thibert Creek Mining Company) and considering the amount of dead-work done on these the returns were encouraging; and it is the intention the coming season to place two hydraulic plants on this property for the better working.

On Mosquito creek four placer leases have been granted to S. J. Gothard and associates, of Vancouver, and on which development-work is to be started the coming season.

On Deloire creek the Mitchell property, consisting of Leases Nos. 50 and 54, has been taken over by Captain S. C. Barrington, of Seattle, who will have two men at work all winter testing.

On Dease creek one lease has been applied for by Bryan & Hankin, who are busily engaged in getting out timber for a flume.

On McDame creek, from reports received, it is expected that the Pendleton Mining Company will have a force of men at work the coming season on Lease No. 69. On Lease No. 86 a steel frame for a water-wheel and a centrifugal pump with 1,000 gallons a minute capacity has been ordered by Max Enderly.

The annual report of the Resident Engineer, Geo. A. Clothier, who visited the district, will practically cover everything, so I will have nothing more to add.

Office Statistics—Stikine and Liard Mining Divisions.

Revenue collected from free miners' certificates	$ 375 00
Revenue collected from mining receipts	1,816 40
Revenue collected from other sources	5,962 78
Total	$8,154 18

SKEENA DISTRICT.

SKEENA AND BELLA COOLA MINING DIVISIONS.

REPORT BY J. H. McMULLIN, GOLD COMMISSIONER.

I have the honour to forward you herewith the office statistics of the Skeena and Bella Coola Mining Divisions.

The report of the Resident Engineer fully covers the mining development for the year and I have nothing further to add to his report.

OFFICE STATISTICS—SKEENA AND BELLA COOLA MINING DIVISIONS.

Free miners' certificates (individual)	458
Free miners' certificates (company)	3
Free miners' certificates (special)	3
Mineral claims recorded	208
Certificates of work issued	197
Bills of sale, etc., recorded	27
Certificates of improvements issued	18
Filings	11

Revenue.

Free miners' certificates	$2,261 75
Mining receipts, general	1,422 95
Total	$3,684 70

QUEEN CHARLOTTE MINING DIVISION.

REPORT BY J. L. BARGE, MINING RECORDER.

I have the honour herewith to submit my annual report for the Queen Charlotte Mining Division for the year ending December 31st, 1919.

The year 1919 seems to have been a year of recuperation after the war, very little ore having been shipped to the smelters. The *South Easter* mines at Skidegate, the *Producer* at Jedway, and the *Ikeda* mines, also at Jedway, have been steadily prospecting and developing, and a general resumption of activity is looked for in the early spring.

OFFICE STATISTICS—QUEEN CHARLOTTE MINING DIVISION.

Free miners' certificates issued	86
Mineral claims recorded (quartz)	40
Mineral claims recorded (placer)	4
Certificates of work issued	77
Bills of sale and records	9
Filings	9

Revenue.

Free miners' certificates	$ 373 25
Mining receipts	533 00
Trade licences	205 00
Firearms licences	107 50
Police Court fines	245 00
Marriage licences	55 00
General receipts	4 50
Total	$1,523 25

PORTLAND CANAL MINING DIVISION.

Report by P. S. Jack, Mining Recorder.

I have the honour to submit herewith office statistics for the Portland Canal Mining Division for the year ending December 31st, 1919.

George A. Clothier, Resident Engineer, is furnishing full reports on the mining activities in this Division for the past year.

Office Statistics—Portland Canal Mining Division.

Free miners' certificates (individual)	340
Free miners' certificates (company)	2
Mineral claims recorded	549
Certificates of work issued	354
Bills of sale, etc., recorded	192
Filings	43
Certificates of improvements recorded	13

Revenue.

Free miners' certificates	$1,767 00
Mining receipts, general	4,598 65
Other sources	156 00
Total	$6,521 65

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NORTH-EASTERN DISTRICT (No. 2).

REPORT BY JOHN D. GALLOWAY, RESIDENT ENGINEER.

GENERAL REMARKS.

During the year 1919 the North-eastern District progressed favourably in mining development, and the total production was nearly as large as that of the previous year. The actual production of placer gold will show a slight decrease as compared with 1918, but placer development has been active in the Cariboo and Quesnel Divisions. The output of silver, lead, and zinc for the district is mostly made by the *Silver Standard* mine at Hazelton. This mine has had a satisfactory year, with about the same production as in 1918. The copper production will be considerably lower this year than in previous years owing to the *Rocher Déboulé* mine having been closed down all year.

A small production of coal, amounting to about 1,750 tons, was made by the Telkwa Collieries.

The following figures give the output for the year 1919 and the corresponding figures for 1918:—

	1918.	1919.
Placer gold (oz.)	4,400	3,900
Lode gold (oz.)	985	147
Silver (oz.)	84,125	72,573
Lead (lb.)	123,568	180,455
Copper (lb.)	643,843	16,205
Zinc (lb.)	313,112	224,539
Coal (tons)	470	1,752
Miscellaneous (dollars)	7,400	4,000

While the production of the North-eastern Mineral Survey District for the year 1919 does not show any increase over that of 1918, nevertheless, considered as a whole, mining activity for the year was satisfactory. This district is as yet in the prospect or development stage; no real development was possible until the Grand Trunk Pacific Railway was completed in 1914, and although since that time several properties have been brought to the shipping stage, the district as a whole has not progressed as fast as might have been expected. Many reasons could be given for this, chiefly that during the war labour and financial conditions were not conducive to the opening-up of a new country.

During the last year a considerable change has taken place in the country, and it is particularly noticeable in the way in which settlers are taking up the land. This increase of population will no doubt add to the prospecting carried on in the country, as well as gradually improving the wagon-road transportation.

There are in the North-eastern District hundreds of claims in the prospect stage, many of which warrant more extensive examination and development than has yet been given to them. While the war was on but little attention was paid to these by examining engineers, but gradually many of these properties are being investigated. The counter-attraction of a decided "boom" in the Stewart country to some extent prevented the North-eastern District securing the attention it might have had in 1919.

Generally, however, the outlook for the future is promising, and a steady growth in mining development and production may be expected in the future.

It is very encouraging to be able to report that, whereas gold-mining and production seems to be on the decline in many parts of the world, in the Cariboo District the outlook for the future, due to present activity, is satisfactory.

For some years past placer-mining in the district has been confined to half a dozen hydraulic outfits and a few individuals working in a small way.

During the seasons of 1918 and 1919 a number of prospective placer enterprises were considerably advanced; so much so that some of them now give promise of soon reaching the productive stage. Of these enterprises, the proposed installation of a dredge on Antler creek is a most important one. The area to be dredged is owned by Moore and associates, and has been thoroughly tested by Keystone-drilling. There is a considerable yardage available for dredging, in which the values are much higher than is usually obtained in dredging-ground.

PORTIONS OF
OMINECA and BELLA COOLA M. Ds.
Shewing Eutsuk and Tesla Lakes.
Scale
To accompany Report of
J. D. Galloway, Resident Engineer
1919
EUTSUK LAKE
Portage
½ m To
Whitesail Lake
St. Thomas cr
Porphyritic rocks
Mt. Morgan
8000
Killobe lake
Surel
3500
Pass
Granite rocks
Camella cr
Bone cr
Big Bear Is
2650
Sandy Pt
Alna bay
Pondosy Lake
Loos Lake
Ice Hill
3427
Elel lake
Pass
Glacier
Indian houses
The Ius
4800
Farbus
3800
3500
Lake
Salahagen L
Salahagen R
6000
6000
6000
6000
6000
8000
7000
7000
5000
Tesla Lake
Vrely L
3300
Tesla mt
Caboose
8300
Tesla cr
McCormick L
SPECULAR
Mineral Claims
3045
Tahunteabo L
Unchielat cr
Unchielat L
Nahluzan L
3830
Oppy lake
3600
Chezko
Sigurd R
Sigurd rocks
7300
Battleneck
mountain
6500
7500
Surel cr
High Peaks and Glaciers
5230
6000
6500
9020
Prominent Peak
Toplola L
Lat 53° N
Long 127° W
Cariboo Mountains
Porphyritic rocks
5630
Mount Watut
to Tatachuck
Siqutlat L
2300
trail
grassy plateau
7022
Peak
4560'
6000
Sachumka L
Rolling hills
Pass
2500
3500
3300
3500
3300
Height of Land
Ireasyuko L
Siqutlat R
2321
Dean R
Old Volcano
Salmon House
1433
Takla R
Hmsquit R
High Peaks and Glaciers
7000
6000
6400
6700
Glacier
Plateau
3,000
Dean R
Mineral Claims
(Iron)
Cannery
Indian Reserve
KIMSQUIT
PO Cannery
B.C. Bureau of Mines

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Other placer propositions are being equipped with a scraper-dredge system of dredging, and one of this type was in operation during the season at Harpers camp.

The amount of placer-work being carried on by drifting is comparatively slight, but shows an increase during the past season. Most of this work is exploratory, as, for instance, on the Antler, Jack of Clubs, and other creeks. The *Kitchener* mine on Keithley creek had a highly satisfactory season, as some rich ground was struck in a portion of the old bench-gravel.

During the year the gold-quartz properties on Proserpine mountain owned by Armstrong, Tregillus, Blair & Carey were optioned to Robert A. Bryce, representing a Toronto syndicate. Work was commenced in the fall and it is expected that by spring a considerable amount of development will have been accomplished.

Another important development in the Cariboo District during the season was the commencement of the testing of the placer-gravels at Harpers camp. The prospecting of this area by Keystone-drilling has been under consideration by the Mines Department for some time past, and about the end of November the work was begun.

A description of the general physiographic, topographic, and geologic features of the North-eastern District can be found in the Annual Reports of the Minister of Mines, 1914 to 1918.

ROADS AND TRAILS.

During the season of 1919 the Resident Engineer examined and reported on numerous applications for assistance in building roads and trails under the provisions of the "Mines Development Act." Following are the more important mining trails and roads that were built or improved during the year:—

(1.) Repairs and new construction on the Hudson Bay Mountain road, converting it from a sleigh-road into a wagon-road.

(2.) New double-ender sleigh-trail from end of wagon-road on Driftwood creek to McCabe property in Babine range.

(3.) New trail from Harvey property to wagon-road on Driftwood creek.

(4.) New trail from Ootsa Lake wagon-road to Sweeney mountain; work commenced.

(5.) Improvements to trail from Houston to Sweeney mountain.

(6.) New trail from Schufer property to Lake Kathlyn Station; work half completed.

(7.) In the Cariboo District various small grants were made to improve and repair trails in the vicinity of Barkerville. This work was in aid of both placer and lode mining.

During the first five months of 1919 the Resident Engineer was in the Victoria office of the Department of Mines. Very little field-work could be done until July on account of snow in the mountains, and an early cold snap with snow coming in the middle of October made the field season an unusually short one.

OMINECA MINING DIVISION.

Skeena River Section.

This section includes the territory contiguous to the Skeena river and its tributaries between Copper City and Skeena Crossing. Many mineral claims are held all over this area and during the year 1918 development-work was done in several places.

The more important localities in which work was carried on are: Vicinity of Usk, Kleanza creek, and Legate creek. Most of the important claims have been reported on by Government Engineers in the past five years; their reports can be found in the Annual Reports of the Minister of Mines. The *Fiddler* group on Fiddler creek was described in detail in the 1916 Report, and since that time no further work has been done on the property.

Usk.

The town of Usk, situated 100 miles north-east of Prince Rupert, on the Grand Trunk Pacific Railway, was the centre of considerable mining activity during 1919.

Kleanza Co. During the summer this company was organized for the purpose of developing properties acquired near Usk. To begin with, the main business of the company would appear to be in lumbering and sawmilling. A considerable area of valuable timber limits was secured and the construction of a large sawmill commenced. The development of the water-power on Kleanza creek with an hydro-electric plant was commenced and work is being continued all winter. This company is also a mining company and

has acquired the *Golden Crown* group by purchase from the owners, Wells & Durham. A crew of men was kept at work during the summer and fall stripping the two quartz veins that occur on the property. These veins, which carry values in gold and copper, have been exposed for considerable distances and are reported to be showing up well. It is proposed to further develop these veins by means of drift-tunnels, but this work will not be started until power is obtainable from the power plant now in course of erection.

The rock formation on the *Golden Crown* is a granite rock, in places quite schistose. Cutting this and also the veins are black lamprophyre dykes. There are two quartz veins on the property, one of which splits into two stringers. This vein below the split has been prospected by three tunnels—No. 3, 105 feet long; No. 2, 33 feet long; and No. 1, 115 feet long—which were driven some years ago. Throughout these workings the vein varies in width from 5 feet down to a few inches and is very irregular. Arsenopyrite in small quantities is irregularly disseminated through the quartz. In places the oxidization of the arsenopyrite gives a rusty, honeycomb appearance to the quartz. Specimens showing particles of free gold are found in these veins.

The values are in gold and are irregular. It is probable the gold is mainly carried in the arsenopyrite, although some of it may be free in the quartz. The results of the samplings of the veins by the Kleanza Company are said to have been satisfactory and the veins have been stripped for considerable distances on the surface. It is said that active development will be carried on in 1920.

This property was reported on in detail by W. M. Brewer in the 1914 Annual Report.

Cordillera Group.

This property, situated one mile from Usk and owned by the Kitsalas Mountain Copper Company, has been fully described in previous Annual Reports. During the summer the erection of a small mill on the property was commenced. A site was cleared and the necessary buildings erected. When the property was visited this work was in progress and some of the machinery on the ground. A good deal of delay was experienced in getting in the machinery, but it is believed the mill was completed late in the fall. The mill will consist of a jaw-crusher, Gibson mill for fine grinding, and a Wilfley table. The motive power will be gasolene-engines.

The development on this property consists of an incline shaft 60 feet deep and a crosscut tunnel 400 feet long, which taps the vein prospected by the incline shaft. In driving the crosscut tunnel 121 feet from the portal, a vein, which apparently does not outcrop on the surface, was cut and then drifted upon for 122 feet to the south, where a winze was sunk to a depth of about 15 feet. In the winze the vein widens out to 3 or 4 feet, consisting of, roughly, one-third quartz and two-thirds schistose gangue. Bornite and chalcocite occur through the quartz, while free-gold specimens are quite often found. This vein, which occurs in schistose rock, is faulted along the roof of the drift. During the winter this vein is to be developed.

Lucky Loop.

This property, which adjoins the *Cordillera* to the south, was described in last year's Annual Report. Last year it was leased by A. Roark, C. Seeber, and Harry McMahon. They drove a drift-tunnel 60 feet in on the vein and sank a winze 18 feet deep at a point 30 feet from the portal. A cabin was erected and also an ore-sorting shed at the mouth of the tunnel. From the drift, winze, and a short stope which was put up 10 feet about 30 tons of mixed ore was taken out. About 10 tons of clean ore was sorted out from this and sacked up, but was not shipped and is still on the property. At present no work is being done.

The property, which is owned by L. E. Moody and Richard Lowrie, is favourably situated, being only a short distance from the railway and at about 1,000 feet higher elevation. The vein occurs in schist and is well defined, being from 1 to 2 feet wide. The gangue is schistose rock with a certain amount of quartz scattered through it, often in bands. The sulphides occurring in the vein are bornite, chalcopyrite, and a little pyrite.

Paystreak Group.

This group of eight claims is situated on the west side of Kitsalas mountain, practically at the top of an elevation of about 4,500 feet. The present trail, used to reach the property from Usk, is a very poor one and is not passable for horses on the upper end. The main showing on the property is a quartz vein striking N. 60° E. (mag.) and dipping slightly to the south-east. This vein is exposed in a bluff for a height of about 25 feet. The fracture is about 3 feet wide and on one wall has about 4 feet of soft schistose rock. Next to this is a hard flinty rock believed to be a quartzite.

It would appear that there is at this point a soft basic dyke cutting the quartzite, and that the quartz vein has formed in the hanging-wall side of the dyke. A tunnel has been driven in at the foot of the bluff and on the vein for a distance of 20 feet. At the face of the tunnel the quartz is about 3 feet wide.

The quartz carries some chalcopyrite disseminated through it and in places a little galena. A sample taken across 3 feet of the vein assayed: Gold, trace; silver, 1.6 oz.; copper, 1.5 per cent. Another sample of selected ore gave: Gold, 0.04 oz.; silver, 6.8 oz.; copper, 7.1 per cent.; lead, 14 per cent.

Another showing on the property is called the "Big Lead." This is a dyke of soft, black basic rock cutting through the quartzites. It is from 10 to 20 feet wide and in places split up. There is some mineralization throughout the dyke and the quartzite walls with chalcopyrite and a little bornite and galena. Where the dyke is split up the mineralization is most pronounced. An open-cut had been made in the dyke, but this had filled in again, so could not be examined, but some good-looking copper ore had been taken out. More work is required to determine if the showing would be of value.

Frying Pan Group. This group is situated on the south-east face of Kitsalas mountain, near the top. L. E. Moody and partners are the owners. On these claims there are a number of black basic dykes cutting the quartzite, and in these dykes there is a slight irregular mineralization with copper minerals. This mineralization is either in the dykes or in the quartzite, but close to the lines of contact. The general strike of these dykes is north-east and south-west. The copper minerals noted were chalcopyrite, bornite, and carbonates of copper. Several exposures have been prospected by small open-cuts. The most important is one at the top of a bluff. A grab sample from this cut, which would represent the best of the rock seen, assayed: Gold, 0.02 oz.; silver, 0.8 oz.; copper, 1 per cent.

Bornite King Group. This group, consisting of the *Queenie*, *Elizabeth*, *Nancy*, *Alice*, *Maria*, and *Princess* claims, owned by Andrew Pete and A. Baxendale, is situated near the top of Bornite mountain, some eight miles from Usk by pack-trail. The main showing on the *Queenie* claim is a quartz vein varying from 2 to 4 feet in width and exposed naturally. The only metallic mineral noted in the quartz is chalcopyrite, occurring in sparing quantities. A selected sample of ore assayed: Gold, trace; silver, 0.6 oz.; copper, 2.2 per cent.

On the *Elizabeth* claim a quartz vein is exposed in a draw near the top of the mountain. It is from 12 to 18 inches wide and occurs in a diabase rock. The quartz gangue carries small quantities of galena and chalcopyrite. A sample taken across 1 foot returned on assay: Gold, trace; silver, 10.6 oz.; copper, 1 per cent.

On the *Maria* claim a small irregular fracture in diabase occurs which carries some high-grade copper minerals—namely, bornite and chalcocite. The widest place noted was about 5 inches. A selected sample of the copper minerals assayed: Gold, 0.05 oz.; silver, 68.8 oz.; copper, 34.4 per cent. The owners were about to commence work on this showing when the property was visited.

Legate Creek.

The showings on the claims at the head of the Legate creek were described in the 1916 and 1917 Annual Reports. The creek was visited again this year and it was found that about a dozen prospectors were at work on their claims during the season.

This camp should attract some attention during the season of 1920. The showings of ore consist of high-grade copper and silver ore and the veins are such that they warrant exploration.

From Pacific, a divisional point on the Grand Trunk Pacific Railway, a good trail runs up Legate creek on a small grade to the forks, a distance of twelve miles. The various properties are situated on the mountains around the forks of the creek and are connected by branch trails to the main trail.

A shipment of ore amounting to about 30 tons was made last season from the *M. & K.* property.

M. & K. Group. This property, which is owned by Whitmore & Orr, is situated about three miles from the forks of Legate creek and has been developed each summer by the owners for the past four years. In 1916 the property was bonded by Price & Aitkin, who shipped 120 tons of ore and then allowed the bond to lapse. This ore was "float," as it occurred irregularly distributed up and down the hill in surface clay. The work

of the owners since that time has been directed to tracing up this float-ore to find the vein from which it came.

Open-cuts and tunnels have been driven and certain ore-showings have been discovered, but the class of ore in these showings differs somewhat from the float-ore. The stripping of the overburden on the hillside is a serious hindrance and necessarily a great deal of work is required.

During the season of 1919 an open-cut up the hill some distance from where the float-ore was taken shows a vein apparently in-place. This vein is lying on the slope of the hill and has a strike of N. 30° E. and a dip of 35 degrees to the west. The vein is from 1 to 2 feet wide and shows some good ore, but consists partly of leached material. Above this cut is another one in which the vein is narrower and lies almost flat. Below the large cut a small tunnel has been run in on the vein 20 feet. This drift has a small stringer at the face.

Much more work will be required to tell much about these occurrences, but the grade of the ore and the quantity exposed on the hillside are sufficient reasons to warrant extended search.

The ore shipped in 1916 consisted of a mixture of galena and bornite which returned about 25 per cent. lead, 20 per cent. copper, and 25 oz. silver to the ton. The ore shipped this year apparently carried less galena. It was shipped to a copper-smelter and only the copper and silver recovered. It is not known what the returns were.

It is reported that the property has been bonded and that it will be further developed in 1920. This property has previously been described in the 1916 and 1917 Reports.

Independence Group.

This group consists of three claims—*Grizzly*, *Grand View*, and *Independence*—and is owned by J. Burns and Wm. Pierce. The claims are situated on the west side of the basin at the head of the centre fork of Legate creek, at an elevation of 4,000 to 4,500 feet. These claims are easy of access and it would not be hard to put in a good trail to them from the forks, a distance of about three miles.

The vein on this property is a well-defined sheared zone in andesite, striking north-west and angling up the hill. The vein is exposed naturally and by some small open-cuts. In the largest open-cut there is a width of 10 feet of vein-matter, with a horse of country-rock in the centre 2 feet wide. In an open-cut 50 feet above the first one the vein is considerably oxidized, but shows some ore. There are several smaller cuts farther up the hill which show the vein to be continuous, but not exposing the walls. Apparently the vein is split up to some extent. Very little work has been done on the showing, not sufficient to expose the vein properly.

The gangue-matter of the vein consists of andesitic rock and a little quartz. The metallic minerals noted were chalcopyrite, pyrite, arsenopyrite, small amounts of bornite and grey-copper, and some specks of galena. Oxidation on the surface has produced hæmatite in places and some copper carbonates.

The following samples were taken:—Across 5 feet in lowest cut: Gold, trace; silver, 13 oz.; copper, 1.1 per cent. Grab sample from dump, lowest cut: Gold, trace; silver, 11 oz.; copper, 3.4 per cent. Across 4 feet in second cut: Gold, trace; silver, 20.5 oz.; copper, 0.5 per cent. Across 2 feet in third cut: Gold, trace; silver, 0.8 oz.; copper, 3.3 per cent.

This property should prove an attractive proposition to take over and prospect and develop.

Legal Tender.

This claim, owned by J. Burns and Jens Anderson, lies about 1,000 feet down the hill from the *Grizzly* claim. The vein varies from 1 to 2 feet in width. The chief mineralization occurring in the quartz is galena, which is scattered through it. A selected sample of the ore assayed: Gold, 0.14 oz.; silver, 58 oz.; copper, 0.2 per cent.

Bullion.

This claim is situated on the west end of the basin at the head of the centre fork of Legate creek. J. Burns is the owner. The *Jumbo* claim lies to the north and the *Columbia* to the south. A quartz vein is exposed along the foot of a bluff for a distance of 700 feet. The vein strikes N. 25° E. and dips at 40 degrees to the south-east. It is exposed on the dip and so the outcrop runs up the mountain-side. The country-rock in the vicinity is diorite, but the vein lies within a diabase dyke cutting the diorite. Mineralization in the quartz is with chalcopyrite, copper carbonates, and a little galena. A sample of selected ore returned: Gold, trace; silver, 29.6 oz.; copper, 6.4 per cent. An average sample across 1 foot at the lowest outcrop gave: Gold, trace; silver, 1.6 oz.; copper, 1.9 per cent.

Regina Group.

The showings on this group were described in the 1917 Report. Since that time a dispute has arisen as to the ownership of the ground and now is claimed as part of the Halliday property. The owners of the *Regina* group have there-

fore been this past season working on the *Hunter* and *Pacific* claims, which ground is not disputed. The owners are Jones, Brown, Burnes & McManamon. These claims are situated on the mountain facing into the forks of Legate creek.

On the *Hunter* claim two places have been prospected by large open-cuts. The ground here is broken up and badly leached, and while some vein-matter occurs, no definite vein in-place is apparent as yet. One cut is on the line of continuation of the *Regina* vein across the ridge. In the material taken out of the cut a little mineral can be seen.

On the *Pacific* claim two small quartz veins are exposed. One of these, striking east and west, is exposed near the top of the ridge. Several small cuts have been made on it and show it to vary from 1 to 2½ feet in width. The quartz contains a little galena and iron oxide. A sample across 2 feet on assay only returned traces of gold and silver.

Hazelton Section.

In this section the only producing mine during the season was the *Silver Standard*, as the *Rocher Déboulé*, a former big shipper, remained closed all year. This latter property is a copper-mine, and apparently the management considered it good policy to wait for a better copper market. At the present time the mine has a considerable amount of milling-ore proven, but no shipping-ore is available until further development is undertaken.

If the property was equipped with a small concentrator and a comprehensive development plan laid out, there seems to be no reason why this mine should not repay further exploitation. Probably this policy will be adopted in the near future.

Delta Copper Co.

The holdings of this company comprise the *Delta* and other groups of claims and a control of the stock in the company owning the *Highland Boy* group. The showings, development-work, etc., have been fully described in previous annual reports. In the winter of 1918 to 1919 a crosscut tunnel was started on the *Delta*, but after driving about 100 feet the work was stopped and nothing further has since been done. Apparently the delay in continuing vigorous development of this property has been due to the inability of the company to finance such work. However, it is believed that this condition is now changed, and it has been announced that work will commence early in 1920. W. G. Norrie-Lowenthal has been retained as consulting engineer, and under his direction the work will be commenced in a short time. The property undoubtedly has merit, and it seems probable that in a short time it will enter the shipping class.

Silver Standard.

This mine was reopened in April after having been closed down from December, 1918. The main reason for closing down last winter was the inability to satisfactorily market the silver-lead and silver-zinc concentrates. Conditions, however, are now such that continued operation may be expected. By the end of October about 3,000 tons of ore had been treated in the mill, from which were produced 390 tons of silver-zinc concentrates and 128 tons of silver-lead concentrates. The lead concentrates carry about 225 oz. silver to the ton and 35 per cent. lead, and the zinc concentrates about 120 oz. silver and 35 per cent. zinc.

Development during the year has been satisfactory. The No. 4 vein now has a continuous ore-shoot of over 400 feet in length. During the year ore was steadily stoped from the main vein, but a considerable tonnage is still in reserve, which can be augmented by further development. The No. 1 vein was stripped on the surface and a good shoot of ore 200 to 300 feet in length was uncovered. Generally the mine is in good shape, and undoubtedly with further deep development the nine veins on the property will yield a large tonnage of ore.

The mill now treats about 25 tons of ore a day. The crusher and jigs are run one 8-hour shift and the tables two 8-hour shifts. The mill is now running pretty well, but a high extraction cannot be expected in a water-concentrator running on a quartzose ore containing galena, zinc-blende, and grey-copper.

The management is at present considering the advisability of remodelling the mill and putting in an oil-flotation plant to treat the tailings, which would result in a much improved extraction. At the same time a deep-level tunnel will be driven to crosscut the vein system at some depth below the present workings. This tunnel will be about 1,000 feet in length. For the present the mill will be kept running, but before long a decision may be made to remodel the mill this winter so as to have everything in readiness for large-scale production next summer.

Nine-mile Mountain.

Nine-mile mountain is an isolated mountain lying to the north-east of Hazelton. Claims have been staked on different parts of the mountain, but the most important are those situated on the slope overlooking the Shegunia river. This camp is known as "9-Mile" and is distant about thirteen miles from Hazelton. The more important properties are the *Sunrise*, *Silver Cup*, *Lead King*, Miller property, and adjoining claims. This camp was described in the 1914 Annual Report.

Many of these claims were developed to some extent prior to 1914, but since that time little work has been done. In 1914 a wagon-road was constructed from 2-Mile, running along the base of 9-Mile mountain and extending to a point below the *Silver Cup* property. This road is in bad repair and the last half of it is now only a pack-trail. Another trail can be used to reach these claims, going up over the mountains, but the road is generally used.

In the summer of 1918 an option was secured on the *Sunrise* and several other properties by J. Errington, who was acting for an Eastern syndicate. Some time was spent in thoroughly examining and sampling the claims, and then a little work was done in stripping the veins on the *Sunrise* claim. Work was stopped in the fall of 1918, and so far as could be learned everything was satisfactory and the intention was to resume the work in 1919. However, in 1919 Mr. Errington did not resume work and in the fall his option expired.

About the end of the year an option on the *Sunrise* was secured by the American Smelting and Refining Company, and under the terms of the deal some work was to be commenced immediately. It is not likely that any extended development can be commenced until the spring of 1920, but it is expected that during the coming year the property will be thoroughly tested.

The formation on 9-Mile mountain consists of Hazelton formation rocks, intruded by a core of granodiorite. The veins, which occur both in the granodiorite and in the metamorphosed rocks, are well defined and vary in size from a few inches up to several feet. The gangue consists partly of quartz and partly of wall-rock. The valuable minerals contained are galena, zinc-blende, stibnite, and grey-copper. The principal value in the ore is in silver, and as a rule the clean ore assays very well in silver. The lead and zinc contents are also important and add to the total value in the ore. In the veins the ore occurs in places as bands and shoots of clean mineral and in others disseminated through the gangue-matter. In past years small shipments of hand-sorted ore have been made from several claims in this camp, but the future depends on developing the properties to the point that one or more concentrators can be operated and the whole of the veins mined and milled. The ore is similar to that of the *Silver Standard* mine, which is being concentrated in the company's mill on 2-Mile creek.

On the *Sunrise* claim there are two veins, which vary in width from 2 to 10 feet. They are exposed for some distance on the surface and are fairly well mineralized throughout. If deep development shows the veins to continue in size and value as they show on the surface, this property should prove a paying one.

TELKWA SECTION.

Hudson Bay Mountain.

During the year 1919 there has been more activity in mining on Hudson Bay mountain than in previous years. While no production is recorded, it is expected, as a result of the work inaugurated this year, that a considerable production may be made next year.

Early in the year the Skeena Mining and Milling Company was organized to develop the *Victory* and *Coronado* groups of mineral claims, situated on the southern slope of Hudson Bay mountain and distant about twelve miles from the town of Smithers. The company started operations in the spring, but stopped work during the summer. A start was made again in October, but shortly after work was again stopped.

The *Victory* group is owned by Donald Simpson, who has worked the property intermittently during the last ten years and who has shipped in all about 50 tons of ore. The ore consists of galena and zinc-blende occurring in a gangue of siliceous rock.

The Skeena Company immediately after acquiring the properties purchased the machinery for an hydro-electric power plant and for a 50-ton water-concentrating mill. This mill is of the Faust type and supplied by the Faust Concentrating and Manufacturing Company, of Vancouver. This milling machinery consists of jaw-crusher, jigs, tables, and screens. In addition, machinery

for a small hydro-electric power plant and an air-compressor was purchased. Most of this machinery was shipped to Smithers and some of it hauled part way to the property.

The company started some development on the *Coronado* group, but this work was confined to some surface stripping. No work was done on the *Victory* group, the management of the company apparently considering that the property was sufficiently developed. It was planned to erect the mill and power plant and then commence mining and milling ore.

During the summer a considerable expenditure was made by the Government (a grant being made from the "Mines Development Act"—Supplementary) on the sleigh-road from Smithers, thereby improving it so that it can now be classed as a wagon-road. This road serves a number of properties on the southern slope of Hudson Bay mountain. It is now laid out on a good grade and as development of the mineral properties warrants will be further improved.

Mamie Group. In October this group, owned by J. Aldrich and situated close to the *Victory* group, was bonded by J. Turner and work on the property commenced. This property has a good strong vein mineralized with zinc-blende, arsenical iron, and in places a little galena. The development will consist of a drift-tunnel on the vein.

Silver Creek Group. Schufer & Woods continued development of this group on the north-eastern side of Hudson Bay mountain. The 30-ton shipment made from the property in 1918 was concentrated at the *Silver Standard* mill in June, and the ore averaged about $175 a ton gross in all values. The construction of a new trail to this property was started this year and it will be finished next season. When this is completed transportation to this side of Hudson Bay mountain will be greatly improved.

All the above-mentioned properties have been described in the Annual Reports of the Minister of Mines, 1914 to 1918.

Babine Range.

Babine Bonanza Co. On this property, better known as "Cronin's mine," a long crosscut tunnel was started this year and work on it is being continued all winter. This property has been intermittently developed for the last ten years and there is now a considerable tonnage of silver-lead-zinc ore proven. It is hoped that when the new crosscut tunnel, which is projected to be driven about 1,000 feet, strikes the ore-body a sufficient tonnage of ore will be developed to warrant the erection of a concentrating-mill. The property is connected by a sleigh-road with the town of Telkwa, a distance of thirty miles.

Social Group. A new trail was built up Driftwood creek this year to connect this group, owned by McPhee & McCabe, with the wagon-road. This trail serves a number of properties in this section, and as it is a well-graded trail it materially improves the transportation into this part of the Babine range.

Harvey Group. This property is situated on the eastern side of Driftwood creek, distant about twelve miles from Smithers. C. G. Harvey and W. J. Larkworthy are the owners. The showings on the property were described in last year's Annual Report. During the year 1919 Mr. Harvey continued development of the lower vein on the property. The shaft was sunk to a depth of 40 feet, following the vein on the incline. The vein is somewhat broken over, the top part having moved down the hill, so that the shaft, which started vertical, soon flattens out. At the bottom the vein is apparently 8 feet wide, but the actual width may be less as the vein is broken.

This vein occurs in andesite and at the bottom of the shaft has a good foot-wall with a talc gouge on it. The gangue material of the vein is mainly sheared andesite, together with stringers and bunches of quartz. The most important metallic mineral in the ore is chalcopyrite, which is disseminated throughout; in addition, there are small amounts of copper carbonates and grey-copper. A sample taken across 8 feet on the south-east side of the shaft assayed: Silver, 24.88 oz.; copper, 3.5 per cent. Another across 7 feet on the north-west side of the shaft returned: Silver, 16.85 oz.; copper, 1.41 per cent.

No further work was done during the year on the upper vein, the development of which is noted in the 1918 Report.

Silver King Group. This property is situated just a short distance from the head of Driftwood creek and the showings are right beside the creek-bed. The owner is Patrick J. Higgins. In a formation of rhyolite porphyry a quartz vein outcrops, striking N. 70° E. (mag.) and dipping northerly at 60 degrees. The vein

varies in width from a few inches up to 2½ feet. It is mineralized with galena, zinc-blende, and grey-copper. Occasional specimens are obtained carrying native silver and silver sulphide. The vein crosses the creek and on both sides tunnels have been driven in; on the east side the tunnel is 30 feet long and the other one is 10 feet. The quartz is fairly well mineralized with metallic minerals and good silver values are obtained. The property warrants development. Towards the end of the year it was reported that the property had been bonded to Seattle interests and that development-work was soon to be started.

SIBOLA SECTION.

The name "Sibola section" is used to designate an area of country lying to the south-west of Houston, a station on the Grand Trunk Pacific Railway. This area includes the claims around Owen lake, on Sweeney and Sibola mountains, and around Whitesail lake. A description of this country can be found in the Annual Report of the Minister of Mines for 1916. Until the summer of 1919 annual assessment-work on claims and further prospecting had been done, but no extended development had been attempted.

The present route into Sweeney mountain is by an indifferent pack-trail which commences at Houston on the Grand Trunk Pacific Railway, and passes Owen lake; the distance is about fifty miles. Another very rough trail, known as the Bonthrone trail, runs from Sweeney mountain to the wagon-road, passing near the western end of Ootsa lake. This wagon-road is one which extends from Houston around the west end of Francois lake to Ootsa lake, continuing on to the settlement at the centre of Ootsa lake, known by the same name. From here the road extends northerly to Francois lake, where a ferry is operated by the Government, and then on to Burns Lake, a station on the Grand Trunk Pacific Railway. From Ootsa lake to Burns Lake this road is in good condition, but the other half out to Houston is very rough. It is possible to take a small boat from Ootsa lake up the Tahtsa river to Tahtsa lake, which is only distant a few miles from Sweeney mountain.

In order to improve the transportation into this section, grants were made in 1919 from the "Mines Development Act" (Supplementary). The trail from Houston to Sweeney mountain was considerably improved by building a new trail around Sibola mountain, thus eliminating one high summit which had to be crossed on the old trail.

Another trail was commenced from a point on the Ootsa-Francois wagon-road and is projected to follow up the Tahtsa river to the base of Sweeney mountain. This work was commenced but not carried very far during the season.

From Ootsa Lake settlement a small boat can be taken up Ootsa lake, on up Whitesail river to Whitesail lake, and only a short portage of about a mile separates Whitesail from Eutsuk lake. In this way a large area of country can be reached for prospecting by means of water-travel from Ootsa lake. Some claims have been staked in the Coast range in this region.

For a more extended description of the Sibola section *see* the 1916 Annual Report.

Emerald Group.

The most important property in the district is the *Emerald* group, situated on Sweeney mountain and owned by Sweeney, Benson, and partners. The showing consists of a vein varying from 10 to 20 feet in width and mineralized chiefly with galena, together with subsidiary amount of zinc-blende, pyrite, and chalcopyrite. The percentage of galena to gangue is high, sufficiently so as to make good milling-ore, and in many places there are bands of clean galena from 1 to 3 feet in width. The showing is a remarkable one, and now the vein has been traced for 1,000 to 1,500 feet in length and showing values everywhere. The group was staked in 1915 and would not have remained undeveloped but for its distance from a railroad. The transportation problem is admittedly a difficult one for this property and district generally, but it is by no means insurmountable.

In November, 1917, James Cronin secured an option on the *Emerald* group for one year by making a cash payment; in this deal Mr. Cronin was acting for an Eastern American syndicate. This syndicate sent out an engineer in the summer of 1918, who, after examining the property, reported that the location of the property was such as to make it undesirable to take up the option. The Eastern syndicate thus dropped out of the transaction. Mr. Cronin, however, still held his option and renewed it for another year—or until November, 1919—by making a further cash payment. In this last deal Mr. Cronin was backed by Idaho interests.

A number of other claims are staked on Sweeney mountain, some of which will warrant development when transportation of some kind has been arranged into the district.

During the summer of 1919 Mr. Cronin proceeded to develop the *Emerald* group. Supplies were taken in by means of the Ootsa Lake-Tahtsa River route. From a point on the river a good trail was built to Sweeney mountain and at timber-line a camp was erected. From the camp a well-graded trail was built to the showings on the property, which are at an elevation of about 7,000 feet. The distance from the Tahtsa river to the tunnel-site is about seven miles.

The tunnel was driven 124 feet as a drift on the vein. Where the tunnel was commenced the vein showed practically no ore and but little was found throughout the length of the tunnel. At the face of the tunnel a crosscut for 10 feet exposes the full width of the vein. Throughout the tunnel and at the face there are a few narrow knife-blade stringers of mineral—galena and zinc-blende. The tunnel is apparently in vein-matter all the way and in places there are bands of quartz. It would appear that some of the surface showings carrying ore should have been reached by the tunnel and the failure to find ore in this working is disappointing. Mr. Cronin apparently considered so, as he stopped work and dropped his bond on the property. It should be pointed out that a considerable payment on the bond was due in a short time, and undoubtedly this fact influenced the decision to allow the property to revert to the owners. Without question, the surface showings on the property warrant much more extended development than has yet been given to them. It is to be hoped that further development of the property will be carried out during the coming summer.

Silver Tip Group.

This group of claims is situated on a mountain lying between Eutsuk and Whitesail lakes, on the northern slope towards Whitesail lake. A. C. Garde and partners are the owners. In the spring of 1919 an option was given to the Consolidated Mining and Smelting Company on the whole property, amounting to twenty-three claims. The terms of the option are not known, but it provided for a certain amount of work being done on the claims during the summer. This work was done and operations stopped and it is not known whether the option is still in force. The property is reached by taking a small boat from Ootsa lake, up that lake; then up the Tahtsa river to Whitesail river; then up that river to Whitesail lake and up that lake about twenty miles. The total distance from Ootsa Lake settlement is about sixty miles. From Ootsa lake a wagon-road runs to Burns Lake, on the Grand Trunk Pacific Railway, a distance of fifty miles.

When the property was visited no one was on the ground, so that the examination was unsatisfactory, as some important undeveloped showings were not seen. Near the lake-shore on the southern side is the cabin camp which was erected when the *Cariboo* group, also owned by A. C. Garde and partners, was being developed. The trail to the *Silver Tip* group commences from a small bay about one mile west of this cabin. From the shore a trail about two miles in length runs to the vein which was prospected during the past summer. This showing is in the timber, at about 1,000 feet elevation above the lake.

The vein is exposed in several places along a small creek and has an irregular strike; in places it runs east and west, with a dip of 70° to the south. The rock formation is very soft and much leached, apparently of igneous origin.

A tunnel has been driven in 60 feet on the vein. At the face the vein consists of three stringers of ore totalling about 6 inches, spaced across 3 feet of rock-matter. In all, about 25 tons of ore has been taken out and piled up in the driving of the tunnel. This ore consists of a mixture of zinc-blende, galena, and pyrite. An average sample of this dump assayed: Gold, 0.28 oz.; silver, 32 oz.; lead, 22 per cent.; zinc, 20 per cent. A piece of selected galena gave: Gold, 0.06 oz.; silver, 72 oz.; lead, 66 per cent. Selected zinc-blende gave: Gold, 0.08 oz.; silver, 11.5 oz.; zinc, 44 per cent. Selected pyrite gave: Gold, 0.46 oz.; silver, 25 oz.

It was learned later that higher up on the mountain there are some small veins carrying high-grade copper and silver ore, but these were not seen.

Burns Lake Section.

Silver Fox.

This claim, owned by P. Anderson, has been bonded by the Taltapin Mining Company. The property is situated twenty-three miles from Burns lake towards Babine lake. The company started operations late in the fall, and has now built twelve miles of sleigh-road connecting the property with Burns lake and put up camp buildings; eighteen men are at work, and a drift-tunnel, with three shifts at work, is being run. The main vein on the property is exposed in a canyon on 15-Mile creek; it is said to be 8 feet wide, half of which is high-grade ore and the balance milling-ore. Some very high silver assays are said to have been obtained; the ore is a mixture of galena, grey-copper, pyrite,

and chalcopyrite, occurring in quartz gangue. The company will develop the property all winter and expects to put a mill on the ground in the spring.

CARIBOO MINING DIVISION.

It is gratifying to be able to report a material advancement in mining in the old Cariboo District. The production from this district up to the present time has been almost entirely placer gold, but the development of mineral claims now taking place gives some promise of lode-mineral production in the near future. A considerable revival of interest is also taking place in placer-mining, and a number of new properties have been taken up and are being equipped with plants.

BARKERVILLE SECTION.

The hydraulic placer mines near Barkerville made a somewhat smaller production than in 1918. The water-supply during the year was normal and better than in the previous year. The yardage handled was in most cases quite satisfactory, but was somewhat lower grade than in previous years. But for this the gold production would have shown an increase over that of 1918.

During the season a further examination of the district was made by Dr. B. R. MacKay, of the Dominion Geological Survey. This work was a continuation of the investigation commenced last year. This detailed study of the Cariboo placer deposits will undoubtedly prove of great assistance to the operators in the district.

Hopp Mines.

These mines, consisting of *Lowhee*, *Stouts Gulch*, and *Mosquito Creek*, which are operated under the management of John Hopp, were worked fairly continuously throughout the season. *Lowhee* is the most important of these mines and a large yardage was handled during the past season. The ground this year was lower grade than usual, but it is expected that the pit will soon be advanced beyond the drift-diggings of the old-timers, where richer ground is expected to be found.

On *Stouts Gulch* claim side-channels and benches of low-grade ground were worked as was done in 1918, the main channel having been worked to its head in 1917. There is still a considerable yardage of this low-grade ground to work out.

On *Mosquito Creek* the water-supply is small so that the operations are intermittent. The results were about the same as in previous years.

Point Mine.—This property, owned by Loo Gee Wing, of Vancouver, was worked during the season under the superintendency of Joseph Wendle. The output was about the same as in 1918.

Perkins Gulch.—I. I. Felker and W. S. Sparkes continued to operate hydraulically their claim on Perkins gulch. They report a fairly good season, and if a better supply of water was laid on the property a much better production could be made.

The following report on the season's operations at this property was submitted by I. I. Felker, one of the owners:—

"We were handicapped the past season, like so many other operators, on account of the scarcity of labour, working with three men instead of our usual crew of five men. On this account our yardage and output fell below the average of other years. We were unable to bottom up but a quarter part of the pit that we outlined in the spring. Therefore some of the proceeds of this year's work will go over into next year. We moved about 20,000 yards of gravel with thirty days' continuous run in the high water and using the reservoir during the remainder of the season.

"Since the last report, Donald D. Fraser, M.E., has joined the partnership, which enables us to undertake development-work of considerable importance to us. We plan to install a No. 4 plant at the mouth of the creek, using the water from Amador creek, and operate in conjunction with our present plant. This work is progressing as fast as the labour situation will allow, and with no serious drawback the plant will be ready for operation for next season.

"The ditch from Amador creek is just over a mile long and is 3-foot bottom, 1½-foot cut, 1-to-1 slope, with grade of 8 feet to the mile. Flume will be 42 x 36 inches, with 4 per cent. grade. Plant will operate under a vertical head of 250 feet."

Waverly.

This property is situated on Grouse creek, about four miles from Barkerville. It was operated steadily until a few years ago, when it was closed down. Late in 1918 it was acquired by E. Moore and associates and re-equipped for hydraulic operation. Actual hydraulicking was started in 1919, but most of the work was dead-work, in that no pay-ground was handled. It is hoped that the pay-ground will be worked into in the coming season.

Proserpine Mountain.

An important event in the district in 1919 was the commencement of active development of the gold-quartz properties on Proserpine mountain near Barkerville. If the development proves satisfactory a new era of mining will be opened up in the Cariboo, and quartz-mining will receive attention in a district where it has been popularly supposed the only possibilities were in placer-mining. The groups of claims now being tested are typical of many quartz-showings in the district, and if these prove successful others undoubtedly will be developed. These properties have been described in detail in previous Annual Reports, so that only a summary is needed here.

The showings on these properties are quartz veins varying in width from a few feet up to 20 feet and carrying small quantities of pyrite, arsenical pyrites, and smaller amount of galena. The main valuable metal content is gold, which is apparently associated with the iron sulphides. The distribution of the gold values is quite irregular and much development will be required to determine the average gold tenor of the veins as a whole or in workable portions of the veins. It is apparent that when any considerable body of the quartz is considered the average gold value will be low, but it is expected that it will prove sufficient to mine and mill on a large scale and still leave a margin of profit. In other words, a large low-grade mine is the possibility of these properties.

The groups that have been bonded are the Armstrong & Tregillus properties, situated on Proserpine mountain, five miles from Barkerville. The properties have been taken up by Robert A. Bryce, of Toronto, who is backed by a syndicate of Toronto capitalists. Mr. Bryce secured the claims in September and immediately commenced operations. The claims were surveyed and camp buildings erected. The plan of development includes surface work, several drift-tunnels, and one or more shafts. In addition, two diamond-drills will be in operation in a short time. At present about seventy men are employed. The terms arranged were in the nature of a lease and bond extending over some years, with a small cash payment and progressive payments as the time goes on.

Antler Creek Gold Mines.

This company, in which H. C. Carry is the principal stockholder, was formed to work an old placer property on Antler creek, some twelve miles from Barkerville. This property has been prospected intermittently for some years past with the hope of finding the old rich channel of Antler creek. Six men, all interested in the company, were at work on the property during the summer and fall. The work consisted of drifting and sinking in an endeavour to locate pay values. Eventually, if pay-ground is found, it is proposed to make an hydraulic proposition out of it, using Antler Creek water.

Antler Creek.

It is expected that next year a large modern gold-dredge will be brought in and erected on Antler creek. An area of ground on this creek has been tested by Keystone-drilling and the results are so satisfactory that operation by dredging will be commenced. The ground is owned by E. Moore and associates. Mr. Moore supervised the drilling and is now satisfied to go ahead with the plan to erect a dredge. The securing of the necessary equipment was difficult this year, but it is hoped that the plans will mature in 1920. There is a large yardage of ground to work and the values are said to be high.

Quesnel Section.

Lightning Creek Gold Gravels and Drainage Company.

Construction, repair-work, and Keystone-drilling were carried on by this company during the spring and summer of 1919. In the fall a new shaft was started. This shaft will be sunk through the stream-gravels and is for the purpose of opening up the deep channel of Lightning creek, where drilling has shown good gold values on bed-rock. Shafts have been sunk on this property before, but have been lost owing to the heavy water-pressure. The plant is now well equipped with pumps to handle a very large flow of water, and it is hoped that this shaft will be successful in reaching the channel. Work is progressing during the winter.

Placer Mines, Limited.

The property of this company is situated on the Fraser river twelve miles below Quesnel and near the mouth of Kersley creek. The ground to be worked is a bench of the Fraser river.

James F. Reilly is manager in charge of the work. Equipment of the property with a Sauerman scraper was commenced during the summer, eleven men being employed for three months. Work was stopped in the fall.

During the year a company was organized by S. J. Marsh to work gravel-deposits on the Quesnel river ten miles above Quesnel. It is intended to work the ground by the use of a scraper, and the necessary machinery has been bought, but not yet delivered. The work of equipping the property will be commenced in the spring of 1920.

QUESNEL MINING DIVISION.

KEITHLEY SECTION.

R. W. Harrison continued operating the *Kitchener* placer mine with a small crew of men. This is a drifting proposition, and during the season a rich part of the channel was struck, with the result that considerable gold was taken out, the season's clean-up being more satisfactory than formerly.

HORSEFLY SECTION.

Harpers Camp.

The International Dredging Company operated its plant, consisting of a drag-line scraper, during the season, but as yet the ground being worked is mainly an old tailings, so that but little returns could be expected.

The prospecting of this area by Keystone-drilling has been under consideration by the Mines Department for some time past, and about the end of November the work was commenced. It is expected that, if the weather permits, drilling will be continued most of the winter.

A full report on the Harpers Camp area and the proposed Keystone-drilling of the ground can be found in the Annual Report of the Minister of Mines, 1918, pages 136 *et seq.*

To sum up briefly: A small area lying in bend of the Horsefly river at Harpers camp was very rich placer-ground, having produced from $500,000 to $1,000,000. The character of the gold found here showed that it had travelled some distance. It is therefore maintained by many that the small rich area at this point must necessarily have a feeding channel coming into it.

A certain amount of prospecting by means of hand-sunk shafts has been done in attempts to find a continuation of the rich ground, but without success. For such prospecting Keystone-drilling is the most satisfactory method. The work to be done this winter by the Government will be of great assistance to the International Dredging Company in outlining the pay areas in their ground. If the drilling is successful in finding a feeding channel it will mean a great deal to the Harpers Camp area.

So far as the drilling has gone, there is nothing in the way of results to report for the year 1919. So that at present there is nothing to add to the report on the Harpers Camp area written in 1918. When some drilling has been done a more detailed report on the area will be submitted.

During the summer of 1919 a topographic map of the Harpers Camp area was made by Dr. B. R. MacKay, of the Dominion Geological Survey. This has not yet been issued.

The Forks Mining Company.

This company was formed to operate ground located on the Upper Horsefly river, some fifty miles above Harpers camp. The property was not visited, but a description was obtained from the manager, Mr. Sprinkling.

During the season of 1919 the gravels above the forks of the Horsefly river were tested. There is a considerable yardage of gravel here of varying depths, but generally shallow. The testing by means of sluicing and pits showed pay values in many places. The results of the season's work are considered highly satisfactory by the company officials and plans are now being made to equip the property with machinery in 1920.

As the ground lies flat, it is not possible to work it hydraulically. It is intended to install a scraper system, similar to that in use by the International Dredging Company at Harpers camp.

The taking-in of the necessary machinery will be somewhat difficult. The route from Harpers camp is by wagon-road, twelve miles to Quesnel lake; then forty miles up the lake; then over a trail, which rises considerably, for nine miles to the property. The first work done in the spring will be to materially improve this trail.

The property was examined by B. R. MacKay, Dominion Geologist, but his report has not yet appeared.

CARIBOO DISTRICT.

CARIBOO MINING DIVISION.

Report by L. A. Dodd, Gold Commissioner.

I have the honour to submit herewith my annual report on the progress of the mining industry in the Cariboo Mining Division for the year ending December 31st, 1919.

It will be noted that the revenue shows a considerable increase, being nearly double that received for the calendar year 1918.

Beyond the development of quartz properties on Proserpine mountain, about three miles from Barkerville, which were bonded in September last by R. A. Bryce, M.E., on behalf of the Mining Corporation of Canada, and on which a force of from fifty to sixty men has been constantly employed during the past four months, there has been very little change in conditions in the district.

The District Engineer paid two visits to the Division during the season, and a party of the Dominion Geological Survey under Dr. B. R. MacKay worked some weeks near Barkerville. It is anticipated that their reports will cover the progress in mining and conditions, technically and generally.

The Dominion Geological Survey also had a topographical survey party under S. C. McLean in the field. This party established a base-line from which it is proposed to map the Barkerville area.

A discovery of hæmatite near McBride was reported in August; it is stated to be 200 feet wide and traceable for miles.

Transportation of supplies and machinery and labour shortage appear to be the greatest difficulties with which the mining operator has to contend, but with the anticipated completion to Prince George this year of the Pacific Great Eastern Railway these will be largely eliminated.

Office Statistics—Cariboo Mining Division.

Free miners' certificates issued (Barkerville, 242; South Fort George, 178; Quesnel, 125)	545
Mineral claims recorded	234
Placer claims recorded and rerecorded	21
Certificates of work	91
Conveyances and other documents recorded	30
Powers of attorney recorded	51
Filings	14
Certificate of improvements	1
Application for Crown grants	1
Leaves of absence (placer)	15
Applications for placer-mining leases	90
Placer-mining leases issued	50

Revenue.

Free miners' certificates (Barkerville, $1,774.50; South Fort George, $941.25; Quesnel, $585.50)	$ 3,301 25
Mining receipts, general	11,381 25
Other sources	1,105 85
Total	$15,788 35

OMINECA MINING DIVISION.

REPORT BY STEPHEN H. HOSKINS, GOLD COMMISSIONER (OFFICE AT HAZELTON).

I have the honour to forward herewith the office statistics for the Omineca Mining Division for the year 1919, from which, unfortunately, a large decrease in revenue to that received in the year 1918 will be observed, which may entirely be accounted for in the apparent decreased activity in placer-mining within this Division.

As in the past, the Resident Mining Engineer will undoubtedly supply you with reports *re* actual mining development during the past year.

In lode-mining there is undoubtedly renewed activity, but without a flourish of trumpets, which would lead one to anticipate that that branch of the industry is now getting on to a more substantial and permanent basis.

Properties on the Hudson Bay mountain in the vicinity of Smithers have attracted the attention of outside capital and are now being quietly developed.

The Babine Bonanza Mining Company, under the management of James Cronin, is still continuing development-work.

The properties on Blue Grouse mountain in the vicinity of Quick, on the Grand Trunk Pacific Railway, are being steadily developed and show greater promise for the future than at any time during the past.

The *Silver Standard* mine at New Hazelton has been a steady shipper throughout the year.

The *Delta* group on the Rocher Déboulé mountain in the vicinity of Hazelton is now undergoing development operations under the able superintendence of W. G. Norrie-Lowenthal.

At Usk various properties are receiving attention and a considerable amount of capital is being spent on mining development in this vicinity.

It is with deep regret that I have to say placer-mining throughout the Mining Division has not during the past year received the share of attention that it deserves, but it is understood that it is the intention of the Kildare Mines, Limited, to resume operations on their extensive placer-mining properties in the Manson Creek country as soon as climatic conditions will permit.

OFFICE STATISTICS—OMINECA MINING DIVISION.

Free miners' certificates issued (ordinary)	487
Free miners' certificates issued (company)	10
Mineral claims recorded and issued	284
Placer claims recorded and issued	7
Certificates of work recorded and issued	599
Bills of sale and mining documents	136
Powers of attorney recorded	22
Mining documents filed	48
Certificates of improvement recorded and issued	6
Crown grants of mineral claims	6
Applications for placer-mining leases (Peace River)	22
Placer-mining leases issued (Omineca, 5; Peace River, 19)	24

Revenue.

Free miners' certificates	$ 3,066 00
Mining receipts	8,948 25
Total	$12,014 25

QUESNEL MINING DIVISION.

Report by R. M. McGusty, Mining Recorder.

I have the honour to submit herewith my report on mining operations in the Quesnel Mining Division of the Cariboo District for the year ending December 31st, 1919.

As the Resident Mining Engineer of this district is forwarding a report on the various properties throughout this Mining Division, I am refraining from reportng thereon.

During the past season there has been a decided improvement in the general outlook as regards mining; especially noticeable in this respect have been the number of applications for placer-mining leases, which show a decided increase over former years.

The litigation in connection with the *Bullion* claims has, I am informed, been finally disposed of, and doubtless work will start up again on these claims during the coming year.

The Pacific Great Eastern Railway has now been completed to Williams Lake; although as yet the line is not open to passenger traffic, freight is now being handled, which will remove to a large extent the severe handicap this Division suffered from in regard to high cost of freight on machinery to the mines, and the coming year should undoubtedly see great activity in the Hydraulic, Keithley, and Harpers Camp sectors.

Office Statistics—Quesnel Mining Division.

Free miners' certificates issued	109
Mineral claims recorded	25
Certificates of work issued	17
Placer-mining claims recorded	12
Placer-mining claims rerecorded	8
Conveyances, etc.	23

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EASTERN DISTRICT (No. 5).

REPORT BY A. G. LANGLEY, RESIDENT ENGINEER.

INTRODUCTORY REMARKS.

Generally speaking, the production of both the metalliferous and coal mines of the district shows a slight decrease as compared with that of last year, but everything points to this only being a temporary lull, and the prospects for the coming year are most assuring.

The mining industry was somewhat handicapped by the lack of efficient labour, while the unusual dryness of the season curtailed the outputs and interfered with the development-work at some of the leading properties owing to the lack of water for power and concentration purposes.

There has undoubtedly been more activity than last year among the prospects of both East and West Kootenay, while development at some of the most important properties promises well for increased outputs during 1920.

The tonnage treated by the Trail smelter was well over 300,000 tons, and the long list of shippers, including the names of all the important mines in the Nos. 3, 4, and 5 Mineral Survey Districts, also the names of others in the northern extremities of British Columbia, in the State of Washington, and in Manitoba, demonstrates the great importance of this plant to the mining industry of this Province. During the latter part of 1918 and at the beginning of this year the smelting rates under Schedule B of the Consolidated Mining and Smelting Company were severely criticized by some of the mine-owners; hence the Associated Boards of Trade of Eastern British Columbia petitioned the Federal Government to appoint a special commission to investigate and report the fairness or otherwise of the smelting charges. The committee chosen consisted of S. S. Fowler, of Riondel; James Anderson, of Kaslo; and Ivan F. Lashmutt, of Silverton. The investigation was started by the committee on January 21st and its report was completed at the beginning of June. As representative for the Provincial Government, I attended the sessions of the committee and was willingly given access to all data and correspondence.

The report of the committee is the result of careful study and observation of the voluminous data and statements so readily submitted by the Consolidated Mining and Smelting Company, and of the conditions with which the mine-owners of the district have to contend. It deals in a straightforward and adroit manner with the different phases of metallurgical and business matters relative to the smelting of British Columbia ores, and undoubtedly will throw light on many points which were not formerly understood or appreciated by some of the mine-owners. I would consider the report to have fully justified the investigation.

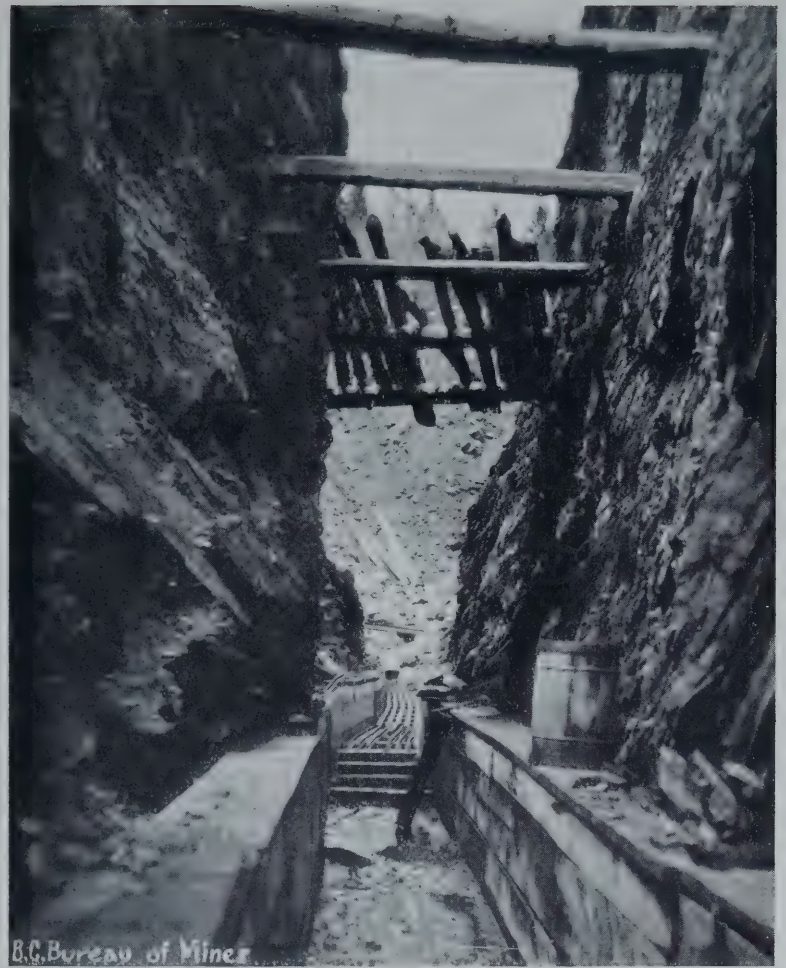
On June 24th the Consolidated Mining and Smelting Company introduced Schedule C, which shows a substantial reduction in charges amounting to an average of about $3 a ton on Slocan ores. This reduction was made possible by the better analysis of the ore-supply and improved metallurgical recoveries.

On September 26th the company notified the mine-owners that they had decided to do away with the old pooling system of settlement for lead and advance payment of 90 per cent. of the apparent value soon after sampling, the final adjustment to be made shortly after the close of the second calendar month after sampling.

During recent years small fortunes have been acquired by mine operators in this district, and while increased activity among the mines and prospects is anticipated, there are still large areas to be prospected, and it is to be hoped that the coming year will witness far more activity in this direction than could be expected during the period of the war. In this connection I might particularly refer to the Big Bend country north of Revelstoke, and to the Golden, Windermere, and Fort Steele Divisions.

Visiting engineers, prospectors, and others seeking information will find the Resident Engineer, Gold Commissioners, and other officials of the Department of Mines always willing to give information regarding various parts of the district.

In conclusion, the writer wishes to acknowledge the courteous treatment and assistance willingly rendered to him at all times by the mining fraternity of the district.



Gamble Mining Co.'s Sluice, Fort Steele M.D.

Slade Mountain from Paradise Mine, E.K.

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EAST KOOTENAY DISTRICT.

GOLDEN MINING DIVISION.

Owing to stress of work in other parts of the district, the writer did not have an opportunity of doing any field-work in this Division during the year. According to reports so far received, the mining activities show little (if any) improvement over those of last year.

The *Couverapee*, at Field, which was the leading shipper, was temporarily tied up by litigation, arising from a dispute regarding the boundary-lines of this property and those of the *Monarch* between the respective owners. According to latest reports, the *Couverapee* and *Monarch* have amalgamated, and are now being managed by Mr. Adkins, who formerly operated the *Couverapee*.

C. J. Lincke, who is interested in the *Tarheel* group of claims on the Middle fork of the Spillimacheen, is reported to be making arrangements to pack out some copper ore.

The *Rose* and *Daisy* claims, formerly known as the *I.X.L.* and *Condor*, have been bonded to Mr. Rowley, who has a small crew of men at work.

WINDERMERE MINING DIVISION.

The activity among the prospects of this Mining Division has been more pronounced than last year, and with the prevailing high price of silver, still further activity may be expected during the coming season.

Paradise.—Mining and development work has been actively carried on during the year at this property, which ranks among the four most important producers of silver-lead ore in the East Kootenay District. A connection has been made from the end of the long tunnel of the No. 4 level with the upper workings, and other raises are now being driven to tap the recently developed ore-shoot below the No. 2 level. The production for the year totals about 2,000 tons, which compares favourably with that of previous years.

Trojan.—Active development-work has been carried on during the season by the Trojan Mining Corporation. A 9 x 8 Ingersoll-Rand compressor and a 35-horse-power gasolene-engine were installed. The principal values are in copper. The ore occurs in a quartz-filled fissure. Shipments for the year amounted to 43 tons.

Sitting Bull.—No mining was done at this property during the year. Thirteen tons of ore extracted during previous years was shipped to Trail.

Burman Group.—Situated on Slade creek, almost opposite the *Sitting Bull*. John Burman, the owner, has been occupied during the season in driving a crosscut to tap the vein, in which a high-grade shoot of ore was encountered in a drift near the surface. At the time of examination the crosscut was driven for 100 feet through a highly silicified limestone, but was not in quite far enough to reach the vein.

Lead Queen.—This property is situated on Frances creek. It was recently acquired by Paul Denhart, of Seattle. During the year 40 tons of silver-lead ore was shipped to Trail. Recent work has consisted of driving a crosscut to intersect the vein at a point below the ore-shoot.

Relief Group.—This property is near the summit of Slade mountain and at a short distance from the *Sitting Bull*. The trail was opened to the property this year, and some work done on the claims by J. C. Pitts and partner, of Invermere. The ore is high-grade silver-lead. A small shipment was made in 1917 from this property, but as the ore had to be packed out for a distance of nine miles to a wagon-road, and then hauled eight miles to the railway, the net profit after deducting transportation charges was not very encouraging, and the property was idle during 1919.

Isaac.—This property is situated on Frances creek at a distance of a few miles from the *Lead Queen*. For many years it has been owned and operated by H. E. Forster, of Wilmer; this year it was bought by Paul Denhart, who, it is reported, intends to operate the property during the winter.

Nip & Tuck.—W. D. McMillan, of Athalmer, has taken an option on this property, and had a small crew of men working this year.

The claims are situated near the headwaters of McDonald creek. It is also reported that E. Watson and others have taken a lease on the *Ptarmigan* and *Red Line* groups, that the results so far have been encouraging, and that teams are now engaged in the hauling of ore.

Delphine. This property, consisting of three claims, is situated on the North fork of Toby creek at a distance of twenty-two miles from Invermere. The old wagon-road which leads past the claims needs a few repairs before it can be used for haulage. The elevation of the camp is 6,650 feet, or about 1,350 feet above the road. R. Randolph Bruce, of Invermere, is part owner and agent for the property.

The vein was discovered many years ago by an Indian and surface work was done as early as 1896, which disclosed an unusually good showing, described in the Minister of Mines' Report for 1898 as follows: "A vein of solid galena, varying from 12 to 36 inches, had been exposed in a series of open-cuts for a distance of some 150 feet." Between the years 1902 and 1905 some 150 tons of high-grade silver-lead ore was extracted from the surface and stoped from workings leading from a shallow shaft. This ore ran from 70 to 148 oz. silver and from 18 to 33 per cent. lead. Since this time the mine has been idle and the camp buildings are rapidly becoming dilapidated.

The vein, which is a well-defined quartz-filled fissure, cuts the formation of siliceous limestone at a slight angle and varies in width from 1 to 3 feet. It has been stoped along the surface for a distance of about 200 feet, and for this distance shows clean well-defined walls. The bottoms of these stopes or cuts are filled with caved material, so that at no point was the vein accessible for sampling.

At the time of examination it was not deemed advisable to tackle the old ladders without a rope, hence the underground workings were not seen; but the following is an extract from the Minister of Mines' Report for 1915, page 94: "The main working is a shaft on the vein 30 feet deep, with a drift 146 feet to the east, where an incline raise goes up to the surface 60 feet above, and a drift 70 feet to the west, and a shallow winze which was full of water at the time of examination. It is believed that other drifts have been run from this winze at a lower level."

The vein has a strike of N. 45° W. and dips into the hill at an angle of about 75 degrees. The hill slopes at an angle of 40 degrees, hence good tunnel-sites are obtainable should conditions warrant further development at a depth.

At a vertical distance of about 150 feet below the outcrop of the main vein a short crosscut reveals a small parallel vein, which has been drifted on for about 20 feet. At the face the vein shows a width of 6 inches, a sample of the ore from this point ran: Gold, trace; silver, 19.6 oz.; copper, 1.6 per cent.; lead, 21 per cent.; zinc, 4 per cent. It is a property that has possibilities, and it seems strange that no attempt has been made to further develop it during recent years.

M. T. Fraction. This property, which is located on the southerly end of the *Delphine* vein, belongs to R. S. Gallop, of Invermere. Here the vein has also been stoped out at the surface for a distance of 50 feet and to a depth of 20 feet. From this stope two shipments were made, and ran as follows: Net weight, 31,036 lb., containing 4.9 per cent. copper and 248.3 oz. a ton in silver; net weight, 38,000 lb., containing 5.6 per cent. copper and 220.5 oz. a ton in silver.

At a short distance in a southerly direction from this stope the vein has been drifted on for 20 feet and shows a width of 11 inches, but only slight mineralization. A sample across the face ran: Silver, 3.5 oz.; copper, 0.18 per cent.; lead, *nil;* zinc, 4 per cent. However, this drift neither gains any appreciable depth on the vein nor does it develop the vein under that portion which has been stoped at the surface.

Tilbury and B.C. This property is reached by following the continuation of the *Delphine* trail for a distance of about four miles towards the summit. The claims are situated on the bare mountain-side at an elevation of 9,400 feet (aneroid reading). A small stone hut affords the only shelter, and owing to its prominent situation furnishes a useful landmark. The claims are principally owned by H. E. Forster, of Wilmer.

According to past records, some five car-loads of ore has been packed out. A sample of some ore sacked for shipment during recent years ran: Gold, trace; silver, 76.5 oz.; lead, 20 per cent.; zinc, 8 per cent. There were about 100 sacks in this lot, which before being shipped would have to be resacked. Snow and ice prevented an examination of the workings. For further reference *see* Minister of Mines' Report, 1915, page 95, and 1909, page 100.

FORT STEELE MINING DIVISION.

Sullivan. The tonnage, amounting to 117,007 tons zinc ore, 14,890 tons lead ore, and 3,060 tons pyrite, shows an increase in zinc ore over that of last year, notwithstanding the fact that the output was seriously curtailed during the latter part of the

year on account of a strike called by the O.B.U. The following brief notes regarding this property may be of interest to those who are not familiar with the character of the deposit:—

In the early nineties the mine was first worked by a shaft and a series of shallow adits from the surface down, and the present main level of the upper workings is the tenth adit. This level is about a mile in length and cuts three distinct ore-zones. The first occurs near the portal of the tunnel, and from which, in the early history of the property, the lead was shipped and the zinc discarded. Most of the ore has been stoped out to the surface, between 50 and 60 feet above the level at this point. Passing through this ore-zone, the tunnel next cuts a pyrite-zone about 1,000 feet in width, from which the Trail smelter derives its supply of iron pyrites for the sulphuric-acid plant.

Finally we come to the north ore-zone, which has proved to be the most economically important and productive deposit so far encountered on this level. Immediately past this the vein is faulted, and the formation has been subjected to crushing and shearing movements. The strike of the fault makes a very acute angle with that of the vein. To date this fault has only been encountered on this one level of the mine. A long crosscut driven at this point to the west was successful in picking up more ore in previously unexplored ground.

In order to develop the large ore-bodies exposed in the upper workings, an adit-tunnel was started from Mark creek several years ago and is now in 8,100 feet. This tunnel runs parallel to the strike of the vein and is in the foot-wall side; the depth gained on the vein is 1,500 feet. Large ore-bodies were developed during the year at a short distance above the tunnel and in ground corresponding to the downward continuation of the first ore-zone in the upper tunnel.

The vein, which has a dip of from 20 to 25 degrees and a strike of north and south, is conformable to the enclosing quartzite formation. The ore is a very fine-grained mixture of pyrrhotite, zinc-blende, and galena.

North Star.—Under the management of O. C. Thompson, this property has been a steady producer during the year, and recently attained the rank of the second largest shipper in the East Kootenay. The bulk of the shipments has been made from the old dumps.

St. Eugene.—This famous property is still producing under the direction of the Consolidated Mining and Smelting Company. Shipments this year are double those of the previous year.

Guindon Group.—This property is situated almost directly opposite to the *St. Eugene*, on the other side of Moyie lake. It is being developed by Frank Guindon, an old-time miner of Moyie. A small shipment of silver-lead ore was made during the year.

Victor.—It is reported that G. Gundry has taken a lease and bond on this property, and intends erecting a 50-ton concentrator during the winter. The property was originally opened up by R. Abernethy, of Spokane, some ten or fifteen years ago. It is situated on Maus creek at a distance of about nine miles southerly from Fort Steele. The ore is rather a complex mixture of galena and zinc-blende, carrying good average values in silver and lead.

At Skookumchuck, on the Kootenay river, prospecting-work has been carried on during the season on a showing of copper ore. It is understood that the extent of the work done so far has not been sufficient to define the ore-body, but the results so far obtained are said to have been encouraging.

Kootenay King.—This property belongs to William Myers, of Fort Steele, and has been developed and prospected by him for a number of years. It is located on a tributary to Wild-horse creek at a distance of about ten miles from Fort Steele. The ore is said to run about 10 oz. in silver and 15 per cent. lead. Mr. Myers put in a season's work on the property.

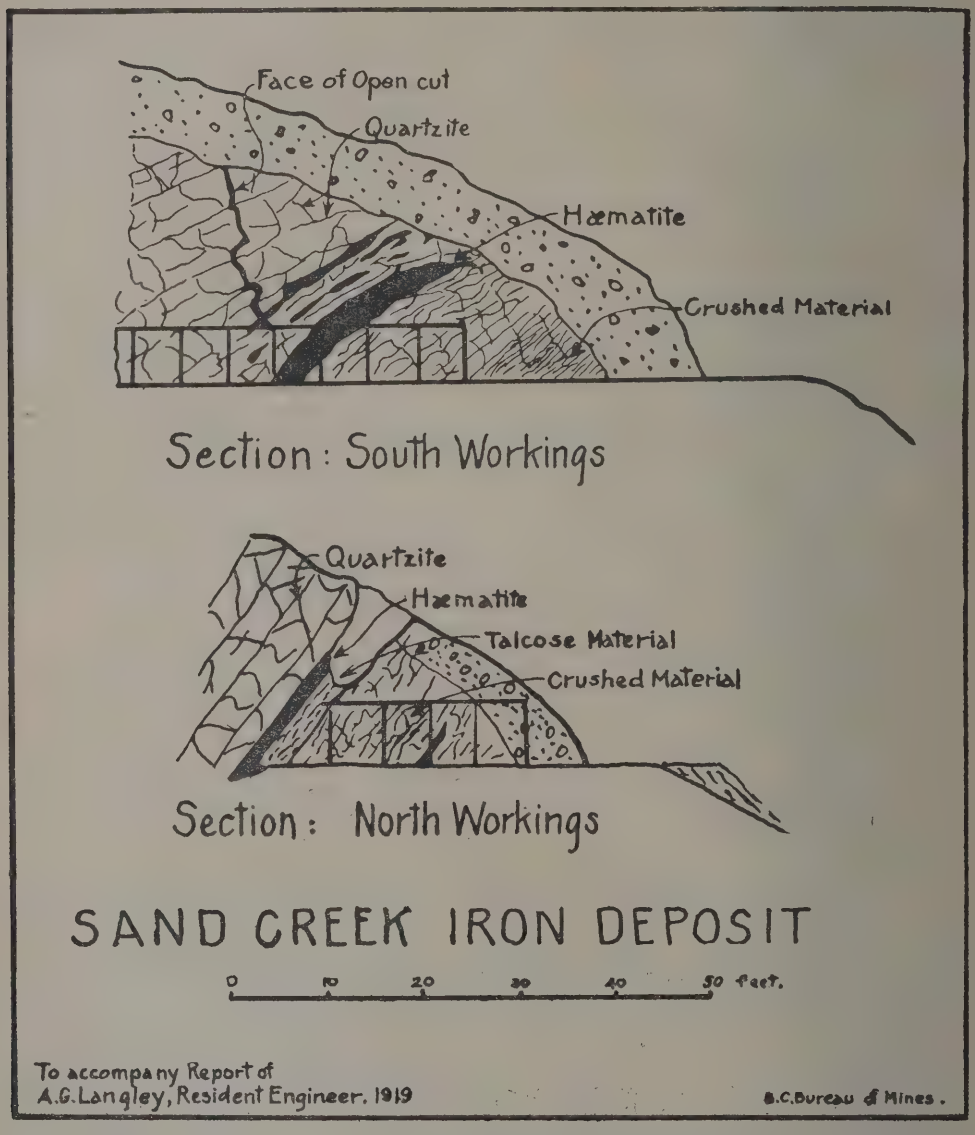
The usual amount of prospecting-work has been done in St. Mary country, and it is reported that Evans Bros., of Cranbrook, who are among the pioneer prospectors of the district, have been successful in bonding the *Achilles* group of copper claims for a substantial amount.

Sand Creek Iron-deposits.

Preliminary exploration has disclosed a vein of hæmatite running in a north-westerly direction along the south side of Sand creek. Three claims have been staked along the strike of the vein and are known as the *Pearson* group, being owned and originally staked by the present owner, W. Pearson. Leaving the Fernie road at Jaffray, it is possible to drive by motor within six miles of the property. A good trail is then followed up the creek. The claims are easily accessible, and a road-grade of not exceeding 3 per cent. is obtainable from Galloway to a point on the creek immediately below the exposures, which are situated at an elevation of from 400 feet to 600 feet above.

The valley of Sand creek in this vicinity is a beautifully wooded country, the timber principally represented being white pine, hemlock, and cedar. On account of the rock in-place being covered with overburden, it is only possible to form a very limited idea of the geological structure of the formation, which apparently consists of quartzites, probably belonging to the Cambrian age, and having a dip of 50 degrees to the south-west and a strike of N. 50° W.

The ore, consisting of a massive red hæmatite, occurs as a bedded fissure-vein replacing the quartzites. The hanging-wall is well defined, but on the foot-wall side the ground is broken and crushed and in places stained with the characteristic red colour of the ore.



At the most southerly working, at an elevation of 4,000 feet, a deep open-cut crosses the strike of the vein and terminates in a short tunnel. Here the formation seems to be broken over, and the ore, which is more or less crushed, does not appear to be in-place, but to have slid over from a higher point up the hill. The ore shows a width of 3.5 feet of massive red hæmatite, a sample across which ran: Metallic iron, 52 per cent.; silica, 22.6 per cent.; phosphorus, *nil;* sulphur, *nil.*

At a slope distance of approximately 120 feet above this showing a diamond-drill hole was put down by Dr. Ings, of Calgary, some years ago, but no record of the work is available, except that the results were not encouraging. At an elevation of 4,000 feet, and at an approximate distance of 300 feet to the north-west, a short tunnel was driven on the vein and a small tonnage of hæmatite extracted. The ground here is broken near the surface and the tunnel is not of much consequence, except to show the persistency of the vein.

Continuing along the side-hill for a distance of about 300 feet, the northerly workings are reached. Here at an elevation of 4,300 feet a short crosscut shows a section of the vein to be in-place. The dip, conforming to that of the enclosing strata, is 50 degrees to the south-west and strike about N. 50° W. The hanging-wall of quartzite is well defined and there is a good selvage between it and the ore. On the foot-wall side, adjacent to the ore, there is a band of about 2 feet of soft talcose material, and general conditions would indicate that the country-rock has undergone more crushing and alteration on this side of the vein.

The ore is a well-defined band of red hæmatite lying next to the hanging-wall and having a width of 12 inches, across which a sample ran as follows: Metallic iron, 57.4 per cent.; silica, 15.6 per cent.; phosphorus, *nil;* sulphur, *nil.* Although the samples taken show the ore to run rather high in silica, it is undoubtedly of good grade, and should a good workable width be developed the mining costs for this class of ore should not exceed $2 a ton.

The hillside sloping at an angle of 30 degrees affords a number of good tunnel-sites, and a depth of about 400 feet on the vein could be obtained by crosscutting from the surface. There is a good camp-site with plenty of timber and water, while power might be developed from Sand creek, which has a flow of about 4 second-feet during the dry season.

It is not unlikely that there may be other parallel veins in this formation, and although the vein is small the good quality of the ore and the easy accessibility of the property are strong factors in its favour, while the possibilities from a geological standpoint appear to warrant further work being done to prove the existence of a sufficient body of ore to be of economical importance.

The preliminary work should consist of trenching and open-cuts along the strike of the vein; then, if the results were favourable, a diamond-drill might be employed to advantage.

St. Mary Prairie.

A short trip was taken to examine a few prospects near Lone Tree butte, which, rising to height of about 500 feet above the slightly undulating prairie country, forms a conspicuous land-mark at a distance of approximately three miles to the east of Marysville. There is nothing worthy of special mention to report on some of these properties, for the simple reason that there was not much to be seen on account of the old open-cuts being mostly filled and the shafts not being in condition for examination

Yankee Girl. On this property, which is owned by the Hon. Dr. King, W. Tarrant, and J. Angus, a shallow shaft exposes a sparsely mineralized quartz vein in quartzite of the Aldridge formation, which latter at this point is apparently an inclusion in igneous rocks of the Purcell sills. The mineralization, consisting of chalcopyrite and iron pyrites, seems to be confined to small quartz veins and stringers. The vein has a width of 3 feet, a strike of N. 30° W., and dip at 65 degrees to the south-west. A sample from the best-looking ore on the dump ran: Gold, trace; copper, 0.3 per cent. Other showings exposed in a few shallow open-cuts were not significant of the possibilities of the property, which can only be established by further work.

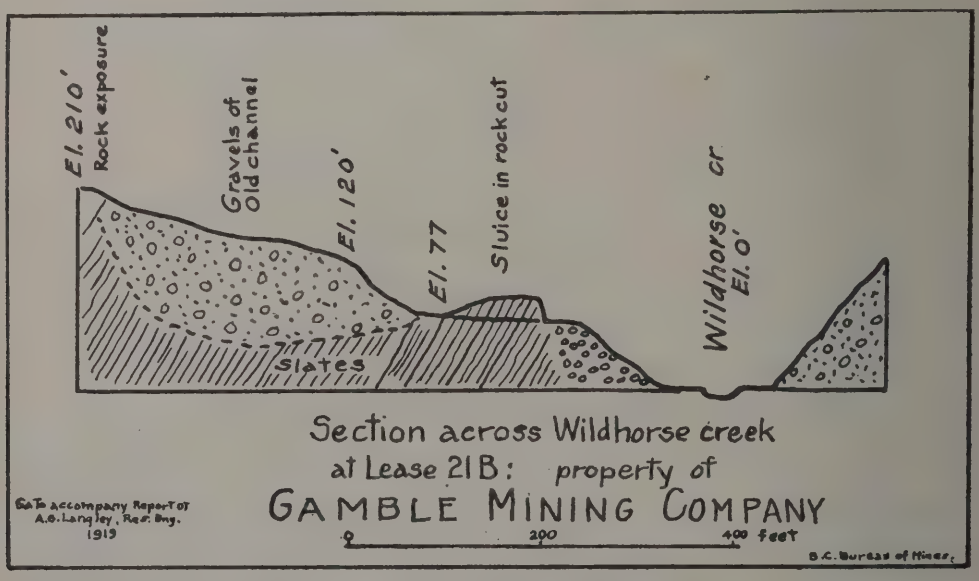
Black Hill. On this claim, which adjoins the *Yanke Girl* group to the north-west, a number of shafts have been sunk, but could not be examined, so I herewith give an extract from the Provincial Mineralogist's Report of 1898: "The formation in the immediate vicinity is composed of an igneous rock, probably diorite, cutting which is a vein 3 feet wide, having a dip of 75 degrees to the north-west and striking N. 75° E. There are three shafts on the property, sunk respectively 40, 30, and 20 feet. The 40-foot shaft has the best showing, but the others are similar in many ways, the vein-matter being calcite and quartz, seemingly in alternating layers of varying thickness. In the upper 10 feet of this shaft a fair showing of galena was exposed, but at this depth that mineral disappeared and the shaft was barren until a depth of 20 feet was attained. At this point copper pyrites appeared on the sides, continuing in small quantities through the vein to the bottom of the shaft, while in the lower few feet a little grey-copper was putting in an appearance."

Luke Group. This group, which is owned by J. T. Laidlaw, is situated on the rounded summit of a small spur of Lone Tree butte. Here an open-cut about 15 feet long and 8 feet deep exposes a quartz vein about 4 feet wide and side-stringers of quartz. The vein strikes S. 30° E. and dips at 80 degrees to the south-west. The bottom of the cut was filled in, and the metallic contents, consisting principally of iron and a little copper, the latter in the form of chalcopyrite, were not in sufficient quantity to be considered of economic value. A sample taken across a width of 45 inches at a depth of 3 feet below the surface gave negligible results. A sample taken from a small pile of sorted ore, possibly extracted from some seam or pocket, ran: Gold, trace; copper, 9.4 per cent.

Grey Copper. This property is situated on the north side of Lone Tree butte and is owned by George Leask, of Cranbrook. The summit of the butte is composed of diorite sill-rock, which overlies the quartzites outcropping on the northerly side of the hill. In this formation a small but well-defined quartz vein occurs, varying in width along the outcrop from a few to about 18 inches. It has a strike of N. 45° E. and a dip into the hill of 45 degrees to the south-east. The principal work done on the vein consists of a 50-foot incline shaft. This shaft was full of water, so could not be examined, but high-grade ore in streaks and small pockets is said to have been struck. The ore is principally grey-copper. A sample taken from about 200 lb. of select ore on the shaft-dump ran: Gold, 0.50 oz.; silver, 78 oz.; copper, 2.8 per cent. It is a promising prospect, well worthy of having further development-work done on it. According to recent reports, R. E. Beattie and associates, of Cranbrook, now have a small crew of men employed at the property.

PLACER-MINING.

The operations of the Gamble Mining Company and the Wild Horse Dredging Company on the placer deposits of Wildhorse creek created great local interest and speculation. The former company piped water across the creek and operated a monitor on some virgin ground on the west side. Owing to the unusual dryness of the season, the shortage of water caused the cessation of operations during the latter part of the summer. However, results were sufficiently encouraging and work will be resumed next season. The sketch is taken from a survey made by W. H. Eassie.



The Wild Horse Dredging Company, which started operations early in the year, proceeded to build a boom dam across the creek, with the object of sluicing the gravel off the bottom of the main channel and recovering the gold from the bed-rock. Although they rushed the construction of this dam, high water came earlier than was expected and washed out one end which was not quite completed. It is reported that another attempt will be made next season. This company

also installed a drag-line scraper above the dam, with which they intend to remove the gravel from the main channel at this point.

On Perry creek A. J. Palmquist has been busy during the season completing a flume to conduct water to a point near the falls, where he intends to operate monitors on a high gravel-bank on the southerly side of the creek.

Coal-mining.

The coal production of the East Kootenay District shows a considerable decrease as compared with that of 1918. The causes of the decrease are due to lack of demand during the earlier part of the year, followed by a close-down from May 24th until late in August. The strike which brought about the stoppage of all work arose from a dispute regarding the wages of the outside workmen in accordance with the shorter hours of labour provided by the Legislature, and finally developed into a struggle between the United Mine Workers and the O.B.U.

WEST KOOTENAY DISTRICT.

AINSWORTH MINING DIVISION.

Near Ainsworth.

Florence. This property, which has been operated steadily during the year, was the largest shipper in this Division. The output compares very favourably with that of last year, which reflects credit on the management, for production was somewhat handicapped by having to contend with heavy wet ground in the spring, requiring continual attention and much timbering. Efficient labour was scarce, and owing to the dryness of the season there was a shortage of water for power and milling purposes for a brief period. During five months it is reported that the average daily tonnage supplied to the mill was about 100 tons.

Bluebell. The production of this mine during the last two years has been to a large extent dependent upon the large deposit of lead carbonates in the surface oxidized zone above the adit level, that from the lower levels of the mine being stopped by the influx of water, which necessitated the installation of more powerful pumping machinery. It is reported that the mine will soon be unwatered and that mining on the levels below the lake-level will be resumed. The production falls short of that of the previous year.

Highland. This mine, which is owned and operated by the Consolidated Mining and Smelting Company, also shows a decrease in production. The concentrator was recently started after being idle for some months. New ore developments are reported. Adjacent claims were acquired, making a total number of seven claims in the group.

Ruth. W. A. Smith and associates work the old tailings-dump under lease. A short section of road was built and the material hauled to the upper terminal bins of the *No. 1* mine. Assay values of various samples taken gave an average of about 10 oz. silver and 1 per cent. zinc. On account of the high percentage of lime a low smelting rate was obtainable.

Tariff.—F. Kennedy and C. Bridge, of Ainsworth, who have been working this mine under a lease, were successful in striking ore on the foot-wall of the vein at the 80-foot level. The road to the property was improved. Total shipments to Trail were 48 tons.

No. 1.—This property, which is owned and operated by the Consolidated Mining and Smelting Company, only shows a production of 219 tons, against about 6,000 tons last year.

Spokane-Trinket. This property has been operated successfully by J. McDougall and shows an increase in production over that of last year. The ore-bodies are small but persistent in occurrence. It is a good example of a small property which can be worked profitably by careful and intelligent management. If encumbered with unnecessary overhead expenses it would probably be doomed to failure, the fate of many prospects and mines.

Quite a little interest has been aroused over promising-looking showings discovered this summer on several properties near the *Bluebell*, and upon which a little work had been done many years ago.

A. J. Curle, of Kaslo, while looking over some ranch land, found a piece of galena float; tracing it up he found the vein in-place. Prospecting-work done on the lead this summer is said to have been encouraging, and according to recent reports more extensive exploratory work will be carried on by a syndicate composed of A. J. Curle, R. Guthrie, and W. T. Kirby, of Winnipeg. So far the results are reported to be very encouraging. Some exceptionally high-grade streaks of ore have been encountered, the values of selected specimens running as high as 2,000 oz. in silver. This is of particular interest, for the ore mined for many years at the *Bluebell* in this vicinity has not carried any spectacular silver values.

The other property, comprising the *Phyllis* and *Gwennie* claims, was staked during the summer by R. D. Hearn and B. L. Eastman. It is reported that some nice showings of galena have been uncovered near old workings which were abandoned many years ago.

South Fork of Kaslo Creek.

Cork-Province. This mine, which ranks as the largest shipper from the South fork, has only been intermittently worked during the year by a small crew of men. An exhaustive examination of the property was made by R. H. Stewart in August. In his opinion about $100,000 is needed to carry out a successful programme of development. Shipments for the year total 225 tons of silver-lead concentrates.

Gibson. This is among the earliest locations on the creek. It was acquired three or four years ago by D. K. May, of Spokane, who by an active stock-selling campaign succeeded in interesting a considerable amount of Spokane and Portland capital. During 1918 a hydro-electric plant was installed under the supervision of W. W. Elmer, the mining engineer in charge of the property. Power will be generated by a Pelton wheel and a 120-kw., 2,200-volt, 60-cycle, 3-phase generator, which equipment is lying all ready to set up in the power-house. A 12 x 12 Sullivan compressor and air-receiver have been purchased and delivered at the mine. The cost of the hydro-electric installation is said to have been about $13,000, and it is estimated that a further expenditure of $5,000 is necessary to complete the equipment and construction before machine-drills can be operated.

Just when conditions appeared favourable for carrying out a more progressive policy of development, the property became tied up in litigation and has been idle since the beginning of the year. There have been a lot of exaggerated statements made regarding this property, and although the possibilities of it becoming an important producer appear to be good, it is yet in the prospective stages of development, and future work alone will prove whether it will make a mine or not.

Flint. It is reported that E. J. Edwards, of Spokane, has acquired this property from the owner, J. A. Carter, of Kaslo. It is proposed to form a company to carry on mining and development work during the coming year. The claims are located about two miles north of the *Cork-Province* mine, at a fairly high elevation.

Silver Bell. This group, comprising three claims, is situated on the South fork of Kaslo creek and is owned by R. H. Green, M.P., and S. H. Green, of Kaslo. The trail leaves the road at a point about half-way between the *Gibson* and *Index* properties and the workings are at a distance of about a mile. The ore occurs in a shear-zone, either in the granite or along the contact of the granite and sedimentaries, as far as could be ascertained from the soft, decomposed material in which they were working. The surface being covered with overburden, coupled with the fact that the workings were caved and being retimbered at the time of the writer's visit, rendered conditions unfavourable for examination and the ore in-place could not be seen. However, the ore is said to occur in streaks and bunches in the soft, crushed material which forms the filling of this sheared fissure or zone.

The principal workings consisted of an adit-tunnel driven into the hillside at an elevation of 4,800 feet; from this tunnel a few car-loads of high-grade silver ore had been extracted, but the tunnel was caved at the end and was being retimbered at the time of examination.

The ore-body apparently dips into the hill at a flat angle, and in order to further develop the property another tunnel was started during the year at a vertical distance of 100 feet below the upper workings. This tunnel was in 270 feet, and according to recent reports ore has been struck in a raise. The ore consists of carbonates, argentiferous galena, and native silver; some very fine specimens of the latter, in the form of wire silver, having been obtained. The silver values of shipments made run as high as 250 oz. to the ton.

Curle's Manganese-deposit, Kaslo.

Curle's Manganese-deposit, Kaslo.

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During the year a new camp-site was chosen lower down the hill and cabins erected to accommodate about 20 men. During the summer months a few cars of high-grade silver ore was shipped, and it is expected that during the winter the output will be increased. About fourteen men are employed at the property and the work is being carried on under the direction of W. E. Newton, of Kaslo.

Silver Bear. This property, which is situated on the South fork of Kaslo creek and almost adjoining the *Silver Bell*, was worked for part of the season under option by the owners of the latter property. The vein, which has a strike of S. 43° W., occurs in a crushed zone of metamorphosed sedimentaries. Apparently the foot-wall is slate and the hanging-wall limestone. A short crosscut shows the width of ledge-matter to be about 40 feet, in which there are occasional pockets of galena and carbonate ore.

Numerous open-cuts along the strike of the vein expose highly oxidized and altered material for a distance of nearly 500 feet. Except where the work has been done, the vein is covered with a considerable depth of overburden. A grab sample of some carbonate ore sacked for shipment ran: Gold, 0.02 oz.; silver, 146.6 oz.; lead, 3 per cent.; zinc, 16 per cent. Very little underground work had been done at the time of examination and the property was still in the prospective stages of development.

Index. This property, which is situated on the South fork of Kaslo creek at an approximate distance of fourteen miles from Kaslo, was bonded during the year by Frank Helme (a pioneer prospector and one of the original owners) to E. J. Edwards, of Spokane. The latter, who previously was foreman at the *Gibson* mine, has taken a very active interest in this part of the country and was responsible for the incorporation of the Index Mining Company, which is now operating the *Index* property. In the past a considerable amount of underground work was accomplished by Frank Helme and occasional shipments made.

The ore has been mostly stoped out from the upper levels, and the future of the property depends largely on the development of the vein in depth. With this object in view, the present company is running a 500-foot crosscut to tap the vein at a vertical distance of 300 feet below the old workings. A 10 x 12 Ingersoll-Rand compressor and a 24-inch Pelton-wheel were installed during the summer. The Pelton wheel is operated under a head of 250 feet.

Besides driving the tunnel, a little prospecting-work was done on the surface near the portal of the upper tunnel, where a small lens of galena was uncovered. A sample of this ore ran: Gold, 0.04 oz.; silver, 44.5 oz.; lead, 62 per cent.; zinc, 7 per cent. A sample of oxidized and highly decomposed ledge-matter ran: Gold, 0.04 oz.; silver, 17 oz.; lead, *nil;* zinc, 4 per cent.

The vein is irregular in strike and dip and occurs in a highly metamorphosed zone of sedimentaries lying in close proximity to and partly included in the intrusive rocks of the Nelson granitic batholith. The shattered and contorted nature of the formation give evidence of there having been great movement, accompanied by the shearing and crushing of the country-rock; hence faults and breaks in the vein may be expected.

Other Properties.

Whitewater. This mine has been mostly worked under a number of leases, there being about thirty men employed. The shipments for the year will total about 900 tons of silver-lead and zinc ore. The company is now doing some work with a view to proving a supposed south branch of the *Whitewater* vein, and the indications in the crosscut are said to be very encouraging. Stringers of clean ore as wide as 6 inches occur in the slates at a point near where the vein is expected to be encountered. W. H. Burgess, of Kaslo, is the manager.

Utica.—T. J. Poyntz and others have been working this mine under a lease. It is reported that in the old workings a rich pocket of high-grade ore was encountered.

Charleston Group.—These claims, which are situated near the *Whitewater* mine, are reported to have been bonded by A. J. Harris to Winnipeg capitalists.

St. Patrick.—This mine, situated near Argenta and belonging to the British Alberta Mining Company, shipped 22 tons of silver-lead ore.

Helen Group. This group, comprising two claims—*Helen* and *Highland*—is situated at a distance of about three miles from Blaylock, on the Kaslo-Nakusp Railway, and at an elevation of 5,600 feet. The property is owned by W. English and

J. English, of Kaslo, who during the last few years have done a considerable amount of development-work. The area in the vicinity of this claim and covering what is known as Stanley basin is composed of highly metamorphosed rocks of the Slocan series, intruded by stocks and dykes of the granitic rocks of the Nelson batholith—conditions which are characteristic of the marginal regions of the batholithic intrusions. The ore, which occurs in a sheared fissure in the granite, was first discovered outcropping near the edge of a bluff.

An open-cut along the strike (S. 55° W.) of the vein at this point discloses a stringer of galena for a length of about 50 feet and also a little carbonate ore. A crosscut was started at 100 feet vertically below this showing and the vein was drifted on for about 300 feet.

This drift is in decomposed granite which forms the fissure-filling and has a width of about 3 feet. The foot-wall is well defined, but the hanging-wall is indefinite. From this level a raise connects with the surface at a point near the northerly end of the open-cut.

A nice pocket of carbonate ore was encountered in the raise, having a width of about 18 inches; the extent of same can only be proved by further work, although the possibilities of winning a small tonnage are encouraging. A sample taken across the width of 18 inches ran: Gold, 0.04 oz.; silver, 56 oz.; lead, *nil;* zinc, 12 per cent. A grab sample from 2 tons of sorted ore from the surface cut ran: Gold, 0.04 oz.; silver, 150.5 oz.; lead, 66 per cent.; zinc, 4 per cent. The upper tunnel is not driven on the vein and does not disclose any ore of importance.

Boulder. This claim is located at an elevation of 6,450 feet near the summit of the ridge to the south-west of the *Helen* group. The ore outcrops in the face of a bluff and along the contact between limestone and slate. Here a vertical section of a vein is exposed for a distance of about 15 feet, having a filling of oxidized gangue material, with which is mixed varying quantities of galena across a width of 12 inches. A sample across this width ran: Silver, 108.4 oz.; lead, 62 per cent.; zinc, 5 per cent.

In order to develop this ore at a depth a tunnel was started at a vertical distance of 50 feet below the outcrop. The only ore developed in this tunnel was near the portal, where a small lens was encountered. A 20-foot winze was sunk on this, which near the floor of the drift shows a width of 1 foot, but pinches to a few inches at the bottom of the winze. Another tunnel was driven at 100 feet below the upper workings. This is now caved, but is said to be in slide material and to have been abandoned before the rock in-place was reached.

The formation, consisting of slates and limestone, is in close proximity to the granite intrusions, and near the summit of the ridge is badly broken and contorted. The vein has an apparent strike of north and south and dips at an angle of 55 degrees to the east. In order to prove the continuity of the vein in a northerly direction a little shallow trenching across the strike at a lower altitude would appear to be worthy of consideration.

Kaslo Concentrator.—M. S. Davys has been busily engaged during the year on a series of experiments with the tailings of the old *Whitewater* mill. Although it is understood that the separation and recovery were satisfactory, the values were not sufficiently high to allow profitable operations, and the plant was closed down in November.

Lincoln.—J. H. Thompson, of New Denver, has had a small crew of men working at this property, and is reported to have struck a nice showing of galena.

Mohawk Group.—Situated near the *Utica* and owned by J. Chisholm, of Kaslo, and others. The property was worked during the year, and some 12 tons of silver-lead ore was shipped to Trail.

Bannockburn.—The development of this property during the year was mostly confined to driving the crosscut tunnel in order to strike the contact between the limestone and schist, along which they expect to develop ore. The claims are situated on Hall creek.

Superior.—Brown Bros. have been actively engaged during the season on this property; the results of the prospecting and exploratory work done have not yet come to hand. The property is situated near the *Bannockburn.*

Near Poplar.

Comstock Group. This property, consisting of three claims—*Comstock, Silver Hill,* and *Noonday* —was originally located by P. J. Sheran, of Nelson, and recently bonded by him to the Nelson Mining and Development Company, of Spokane, and of which F. A. Starkey is president. The claims are situated on the southerly side of Cascade creek at an elevation ranging from 6,000 to 8,000 feet. Leaving the railway at a point two miles

from Poplar, the trail follows an easy grade up the creek for a distance of about six miles to the lower cabin, and then climbs steeply to the mine cabin, situated on the timbered hillside at an elevation of 6,000 feet.

The country-rock, which forms a series of more or less jagged bluffs at a short distance above the cabin, consists of schists and argillites with inclusions of aplite dyke-rock. The whole rock-mass has been subjected to much movement and the formation is broken and contorted. Evidence of uniformity of dip and strike is lacking, and judging by the contour of the hillside it would appear reasonable to come to the conclusion that the ground in this vicinity is not in-place, but has probably slid from a higher part of the mountain-side.

In this formation a quartz vein, sparsely mineralized with galena, outcrops in a few places, but is broken and lacks continuity. A sample from a small pile of sorted ore from the surface ran: Gold, trace; silver, 12 oz.; lead, 22.6 per cent.; zinc, 2 per cent. Two crosscut tunnels have been driven to tap this vein; the upper is 90 feet and has a small showing of ore near the face. A sample of sorted ore from tunnel ran: Gold, trace; silver, 11.5 oz.; lead, 11 per cent.; zinc, 3 per cent. The lower tunnel is in 170 feet, but the vein has not yet been encountered. The vertical distance between this tunnel and the upper is 158 feet.

At the time of examination the property could hardly be considered anything more than a prospect, with indications of ore, but not in commercial quantity, neither had sufficient been developed to encourage any operations on a larger scale at present.

The *Comstock* claim is located on the summit of the rounded ridge above the *Noonday* and at an elevation of 8,000 feet. The surface of the ridge is covered to the depth of a few feet with broken fragments of the country-rock, but a number of open-cuts have exposed vein-matter. At a short distance from the summit, on the easterly slope of the mountain, an open-cut discloses a well-mineralized quartz vein, which unfortunately was covered at the time of examination; the large pieces of ore piled up in the cut would indicate the width of ore to be at least 12 inches. A sample of this ran: Gold, trace; silver, 15.2 oz.; lead, 25 per cent.; zinc, 4 per cent. The formation, consisting of schists and argillites, is cut by aplite dykes, along or near the contact of which quartz veins have been formed. General conditions appear to justify further prospecting-work on this claim, with a view of proving sufficient ore on or near the surface to warrant crosscutting at a depth.

Motherlode Group.

This group, comprising four claims—*Maple Leaf*, *Motherlode*, *Bonny Ann*, and *Lucky Burke*—is owned by A. G. Johnston, of Poplar. The property is situated within two miles and a half of the railway on the east side of Poplar creek and at an elevation of 3,290 feet. The steep hillside on which the workings are located is covered with overburden and well timbered with cedar and hemlock. The work done consists of two tunnels driven into the hillside at a vertical distance of about 50 feet apart. Near the portal of the upper tunnel there is a small surface showing of galena and zinc-blende, which occurs as a replacement deposit in limestone. The tunnel has been driven for 25 feet, without encouraging results.

The lower tunnel has been driven for a distance of 100 feet, disclosing a badly broken and shattered formation. The only ore exposed in this tunnel is a small pocket of galena and oxidized material near the portal, a sample of which ran: Gold, 0.16 oz.; silver, 34.7 oz.; lead, 15 per cent.; zinc, 10 per cent. A sample of sorted ore from the surface near the portal of the upper tunnel ran: Gold, trace; silver, 32 oz.; lead, 29 per cent.; zinc, 2 per cent. Future work should be confined to following the ore where it is found to occur.

Rio Tinto Group.

This group of three claims is situated on Poplar creek within about two miles of the railway and at an elevation of 3,150 feet. It is owned by A. Hansen, of Kaslo, who for many years has persistently carried on development-work, with the result that the underground workings are quite extensive. Work was first started on a surface showing, on which a 33-foot incline shaft was sunk; at the bottom a 40-foot drift connects with a raise from the No. 1 tunnel. In this drift the foot-wall is well defined and the fissure-filling, which was said to carry good average low-grade values at this point, was sampled across a width of 6.5 feet; the result was as follows: Gold, trace; silver, 0.4 oz.; lead, 1 per cent.; zinc, 1 per cent.

At a vertical distance of 160 feet down the hill No. 1 adit has been driven for a distance of about 400 feet. It follows the same well-defined footwall which is exposed in the upper workings and on which there is a thickness of from 1 to 2 feet of black talcose gouge. No ore

is visible in these workings, although a small shoot was said to have been struck near the raise to the surface. The No. 3 tunnel has been driven for a distance of over 100 feet and is about 125 feet below the No. 2. The conditions are similar to those in the upper workings. A sample of the talcose gouge ran 2 oz. in silver.

The formation, consisting of highly metamorphosed slate, has been subjected to much movement, as demonstrated by the slickensided surface of the foot-wall and the crushed material adjoining it; hence it is reasonable to suppose that the tunnels have followed a fissure formed along a fault-plane. It is possible that the mineralization so far encountered owes its origin to cross-veins and veinlets.

Telluride Group. This property, comprising four claims, is situated near Poplar creek and at a short distance from the railway. The claims are owned by P. Kelly, one of the old-time miners of this part of the country. A small quartz vein carrying high gold values is principally developed by a 70-foot adit-tunnel, in which the vein is exposed for a length of about 20 feet. The formation, consisting of a dark schistose rock, probably a metamorphosed slate, appears to be in-place. The vein strikes S. 65° E. and dips to the north-east. In order to gain more depth on the vein the owner has commenced another tunnel at a vertical distance of about 80 feet below the upper. The ore is a gold quartz heavily stained with oxide of iron; the gold is in the free state and in many specimens can be seen with the naked eye. A sample of sorted ore on the dump ran: Gold, 11.3 oz.; silver, 0.5 oz. Although only a small quantity of ore has been so far developed, the values are high and conditions warrant further work being done.

Bullock Group.—Situated within a mile of the railway and at a short distance from Poplar. Exploratory and development work is being done by the Bullock Gold Mines, Limited. The principal values are reported to be in gold.

SLOCAN MINING DIVISION.

SANDON CAMP.

This camp has witnessed a busy season both in mining and construction work, and the future looks bright not only for the mines, but for many of the prospects, in which keener interest than usual is displayed on account of the high price now obtainable for silver.

Clarence Cunningham, whose progressive mining policy, combined with up-to-date methods, has done so much to increase production and encourage the industry, reports that at his various properties the work done during the season has been along the lines of general development. He at present has about 150 men on the pay-roll, and when running at full capacity will employ an additional 100.

No shipments were made from the Alamo mill before August; hence the tonnage is very much below the general average.

The following properties near Sandon were operated by him: *Queen Bess*, *Idaho-Alamo*, *Wonderful*, *Sovereign*, and *Silverite*. It is also reported that he recently acquired an interest in *Bluebird* and *Rawdon* claims, which adjoin the *Reco*. Aerial tramways were completed from the *Sovereign* and *Wonderful* to ore-bins near the railway.

Rosebery-Surprise Mining Company, of which J. P. MacFadden is general superintendent, has been active during the year with mining and development work at the following properties:—

Bosun.—Nos. 4 and 6 drifts are being extended.

Surprise.—The only development being done is the advancement of the No. 4 drift.

Ivanhoe-Canadian Group.—The Nos. 4 and 8 tunnels are being advanced.

Noble Five. The 4-compartment raise connecting the lower workings with the upper is worthy of special mention, it being the largest and one of the longest ever attempted in British Columbia, and its completion without any serious hitch or accident reflects credit on Paul Lincoln, the mining engineer in charge of the property. The size of the rock-cutting is 20 x 7 feet. The length of the raise is 1,000 feet. The two end compartments are used as chutes for ore and waste, while the two centre compartments are equipped with cages for men and supplies. By the development of ore on the lowest level, and also in the intermediate levels, sufficient tonnage is estimated to be available to warrant the erection of the concentrator, which is now nearing completion. This plant is designed by the General Engineering Company of Salt Lake City. The capacity is 100 tons, and the flow-sheet will include jigs, tables, and Callow pneumatic flotation-cells.

The adjoining claims of the *Reco* group were acquired by Jas. Dunsmuir, the owner of the *Noble Five*, and will be developed from the workings of this latter property.

Silversmith. It is reasonable to expect that, with the recent success which has attended the development, this property will again become a steady and important producer. The large ore-shoot which was developed on the 1,000-foot level during 1918 has now been drifted on at the 800-foot level, and the result of the work establishes the fact that the same ore-body is as strong on the eighth as on the tenth level. A considerable tonnage of silver-lead and zinc concentrates was produced during the year.

Rambler-Cariboo. The adjoining claims, *Jennie* and *Last Chance No. 4*, were recently acquired, which gives an additional 1,700 feet of undeveloped ground on the vein, and according to W. A. Cameron, the manager, it is the intention of the company to prosecute development on the different levels in the newly acquired territory next year. Owing to the unusual dryness of the season the shortage of water seriously interfered with mining and development work.

The development of ore at low horizons, both at the *Noble Five* and *Silversmith* mines, should be an incentive for the investment of capital for the purpose of carrying on exploratory work at lower levels than was ever seriously contemplated in the earlier days of the camp. In this connection it is of interest to note that the ore at the *Noble Five* was developed at approximately 3,000 feet below the apex of the vein, while at the *Silversmith* the 1,000-foot level, on which the large shoot of ore was encountered, is the lowest horizon on which ore has been developed in the Sandon camp.

Ruth.—The principal work being done on this mine is the driving of the long crosscut in order to gain depth on the vein. James Anderson, of Kaslo, has charge of the property, which belongs to the Alexander interests.

Carnation.—A small crew of men is engaged at development-work under the management of G. Clarke.

McAllister. Situated on the North fork of Carpenter creek at a distance of about three miles from Three Forks. After lying idle for a number of years, the property was acquired by A. R. Grimes early in the year and a crew of eight or ten men put to work. The operating company is called the Slocan Silver Mines, Limited. The season's work is said to have been highly satisfactory. The ore is a "dry" ore, occurring in a strong, well-defined quartz vein. The values are in silver, mostly in the form of grey-copper. Exceptionally rich pockets are occasionally encountered.

Silver Glance.—Situated at a short distance from Bear lake, on the Kaslo-Nakusp Railway, J. W. Power, the owner, is reported to have bonded the property to G. Huston, of Mullan, Idaho. The ore is similar in character to that of the *McAllister*.

Panama.—This property is now being further developed by the owner, H. Giegerich, of Kaslo. It is situated on the same mountain as the last two mentioned properties and is within easy reach of the railway.

Washington and Silver Reef Groups.—Situated on Payne mountain. Work was continued this year by M. C. Monahan.

Granville Group.—This property, which was recently acquired by a syndicate, is being developed under the direction of George Gormley.

There are a number of other properties on which work is being done in this Division, but information regarding same is lacking at present.

Silverton Camp.

This camp has had rather a quiet season, principally on account of the curtailment of the output from the *Standard* mine, although latterly shipments have been greatly increased.

Van Roi and Hewitt.—During the early part of the season these properties were operated by Clarence Cunningham and a considerable tonnage was mined and milled. Latterly the *Hewitt* closed down temporarily and mining operations at the *Van Roi* were confined to development.

Galena Farm.—This property, which belongs to the Patrick Clark Estate, of Spokane, was worked under lease by James Casey during the early part of the season, but latterly has been closed down.

Echo.—This property was worked under lease by A. L. McPhee and others. About 500 tons of ore was shipped to Trail.

Wakefield.—This property, which is situated on 4-Mile creek and almost opposite to the *Hewitt*, was worked during part of the year by Clarence Cunningham.

SLOCAN CITY MINING DIVISION.

Ottawa.—This property, owned and previously operated by the Consolidated Mining and Smelting Company, was leased by them this year to P. McGuire and A. L. McPhee, who shipped a considerable tonnage from the old dumps.

Republic.—J. W. Evans, of Nelson, and associates, who have recently become interested in this property, have a small crew of men at work and expect to resume shipments shortly.

Evening Star.—Situated on Dayton creek near Slocan. Owned by Hugh Sutherland, of Winnipeg. William Moore, of Nelson, is in charge of the development, which will consist of crosscutting and drifting on the vein at a lower level. It is reported that a small crew of men is at work.

Anna Group. This group, consisting of four claims—*Anna, Milda H., Milda H. Fraction*, and *Hamilton Fraction*—is partly owned by K. Zimmerman, of Slocan. The property is situated on Springer creek at a short distance from the *Ottawa* mine and has been operated almost entirely single-handed by the owner during the last fifteen years. The vein is principally developed by an adit-tunnel about 420 feet in length. For the first 240 feet the tunnel follows a sheared fissure in the granite, in which there are small (if any) values. At the end of this distance a 40-foot crosscut to the west encounters the vein in which the ore is found. A 140-foot drift along this vein shows the walls to be well defined and several small shoots of high-grade ore along the bottom of the drift on the hanging-wall side. The width of the ore varies from a few inches to about 1 foot. In the face of the drift the ore shows a width of 6 inches, a sample across which ran: Silver, 165.5 oz.; zinc, 3 per cent. The silver values occur principally in tetrahedrite, with which is associated a little argentite and native silver, the gangue being quartz. The strike of the vein is N. 10° E. and the dip 33 degrees to the east. A shipment of 17 tons made last year ran: Silver, 244.3 oz.; copper, 0.7 per cent.; zinc, 0.6 per cent.

Though still in the prospective stages of development, it would appear to be a property with good possibilities. E. Hyde is now working the property under lease and bond.

L. T. Group. This group, comprising four claims—*Little Tim, Mammoth, White Heather*, and *Purple Heather*—is situated at the head of the North fork of Springer creek. A good trail of some three miles in length connects the mine with the *Ottawa* road. The property is principally owned by D. B. O'Neail, of Slocan, who was working it single-handed during the summer. The ore, which carries high silver values, occurs in a small quartz vein in the granite, and can best be described by the following analysis of a small shipment made to Trail in June: Silver, 264.5 oz.; lead, 7.1 per cent.; silica, 57.6 per cent.; iron, 1.6 per cent. to the ton.

The principal workings consist of two tunnels driven into the granite bluff which forms the divide between the North fork of Springer creek and Enterprise creek. In the upper or No. 1 tunnel ore was first developed for a distance of about 30 feet along the foot-wall. The No. 2 tunnel was driven at a vertical distance of about 60 feet below the No. 1 and follows the vein for 60 feet, which at this point is faulted by a hornblende-mica dyke. A 32-foot crosscut to the north-west again picked up the vein, which was drifted on for about 100 feet, and for this length ore is exposed having a width of from 4 to 6 inches. From the No. 2 tunnel a raise connects with the upper workings and is in ore all the way. The vein, which has a strike of N. 65° E. and a dip of 70 degrees to the south-east, is said to be the continuation of the *Bondholder* vein, which has been worked on the other side of the summit.

Meteor Group. This group, consisting of three claims—*Cultus, Ottawa*, and *Meteor*—is owned by J. C. Buchanan, who for many years has taken a very active interest in various mining enterprises in the district. The claims are located on and near the summit of the divide between the First North fork of Lemon creek and Springer creek, at an elevation ranging from 6,000 to 7,000 feet and at a distance of approximately eight miles from Slocan. From the *Lily B.* road a steep trail is followed for a distance of two miles and a half to the camp. Two cabins with accommodation for about eight men, a small superintendent's shack, and a blacksmith-shop comprise the mine buildings. The topographical features are characteristic of the mountainous area of the granite formation. The camp is situated in a

small basin, which is partly surrounded by precipitous bluffs, forming a natural barrier to the east and south-east. Until recently acquired by the present owner, the property had been worked for a number of years by leasers, during which period a considerable tonnage of high-grade silver ore was extracted.

The country-rock is granite, cut by basic and siliceous dykes. The vein is a quartz-filled fissure having a dip of 38 degrees to the north and an easterly and westerly strike. It outcrops at the summit of a bluff forming the easterly side of the basin and has been developed by series of tunnels extending from near the top to the bottom. The walls of the vein are well defined and the width is fairly persistent, although bulges and squeezes occur at intervals. The mineralization consists of native silver, argentite, and tetrahedrite, with which is associated auriferous pyrites and a very small percentage of zinc-blende. The vein has been faulted at a number of places by what seems to be a series of parallel displacement faults. This has caused no little inconvenience at times, but the ore was always picked up at the different levels.

Of the old workings, Nos. 1, 2, and 3 tunnels are caved, although access can be gained to the uppermost workings above the No. 1 tunnel from the surface at the top of the ridge. In No. 4 level, on which some 300 feet of crosscutting and drifting has been done, the ore has all been stoped out from a shoot about 30 feet long. The No. 5 level has been driven along the strike of the vein for a distance of about 250 feet. At about 52 feet from the portal the vein was first encountered, and at this point has an average width of about 8 inches, a sample across which ran: Gold, 0.04 oz.; silver, 78 oz.; zinc, 1.5 per cent. This shoot apparently extended along the northerly side of the vein for a distance of about 20 feet, and although the vein can be followed for nearly 100 feet farther, the remainder did not appear to be well mineralized. The other and most important ore-shoot was struck near the end of the level. At this point the ore is exposed along the bottom of the drift on the north side. Here the vein is well mineralized for a length of about 60 feet and has an average width of 12 inches. To show the character of the ore, a sample was taken from the material broken down by three plug-holes at 5-foot intervals, with the following result: Gold, 0.61 oz.; silver, 184 oz.; zinc, 2 per cent. In order to win this ore a 60-foot winze was sunk, and 32 tons was shipped. The gross value of the shipment is said to have been about $22,000.

At the time of examination the winze was half-full of water and work was being confined to the driving of the No. 6 or lower crosscut to develop the vein at an additional vertical depth of 75 feet. In making a cursory examination of this property one is at once impressed with the high-grade ore and the possibilities of a small but steady production under careful and intelligent management.

Howard Fraction. This claim is located at a short distance from the *Meteor* in a south-westerly direction. The property has been abandoned for many years. The old workings from which ore was extracted are caved, hence could not be examined. The following is a description by W. A. Carlyle, published in the Minister of Mines' Report, 1896, page 72: "The granite is traversed by many porphyry dykes, some of considerable width, and also by quartz veins carrying argentite or silver sulphide and varying values in gold. This vein, running about east and west, was dipping northerly into the mountain at a very low angle, or at a dip of 10 to 15 degrees, and an incline had been sunk about 115 feet, but not along the vein, as this was found to be faulted up 3 feet, and 15 feet farther again faulted 8 feet along the same direction of throw, while a third fault had been struck. The vein was 12 to 20 inches wide, of honeycombed quartz, with argentite disseminated through it in crystalline form, and considerable ore had been stoped, hand-sorted, and shipped to the smelters, which returned high values in silver and good gold values, as 7 tons shipped to Pilot Bay smelter in 1895 gave 163 oz. silver and $16 in gold to the ton, and 12 tons more recently, 206 oz. in silver and $26 in gold to the ton."

Since this report was written a quartz vein was traced along the ridge by stripping and numerous open-cuts, and to intersect this at depth a crosscut some 1,300 feet in length was driven, gaining from 300 to 500 feet below the outcrops. The results obtained evidently did not come up to expectations. A sample taken of the oxidized and honeycombed quartz on the dump of the old incline shaft ran: Gold, 0.08 oz.; silver, 15.90 oz.

Black Prince. This property, comprising four claims—*Slocan Prince, Black Prince Fraction, Montreal*, and *Moonraker*—is situated at a distance of nine miles from Slocan and at an approximate elevation of 6,000 feet. The hillside on which the

workings are located is heavily wooded and slopes at an angle of 25 degrees towards the head-waters of the Second North fork of Lemon creek. The camp buildings, consisting of two cabins with accommodation for eight men, blacksmith-shop, and ore-sorting shed, are in a good state of repair, except the latter, which is somewhat dilapidated. The old workings are quite extensive and, generally speaking, in good condition, most parts of the mine being easily accessible. For the last three or four years J. T. Tipping, of Slocan, working the property under lease and bond, has met with encouraging results, although mining has necessarily been carried on by more or less hand-to-mouth methods owing to lack of working capital.

The formation is of the typical granite of the Slocan City area, and in the vicinity of the workings is cut by acidic and basic dykes. The ore occurs in lenticular-shaped shoots, sometimes along the foot and sometimes along the hanging wall of a wide, sheared fissure in the granite. Although high-grade streaks carrying native silver and grey-copper are frequently encountered, the general run of the ore may be described as a fine-grained mixture of galena, zinc-blende, and iron pyrites, with which is associated a little grey-copper and native silver in a quartz gangue. Six car-loads shipped by J. T. Tipping ran as follows: Silver, 140 to 184 oz.; lead, about 5 per cent.; zinc, 4 to 39 per cent. The width of the lead varies from 20 to 40 feet, has a strike of S. 22° W., and dips into the hill at an angle of 60 degrees.

Briefly the workings are as follows: No. 1 level, 129-foot crosscut to vein and 400 feet of drifting. No. 2 level is about 100 feet below No. 1 and consists of a 419-foot crosscut to the vein and 400 feet of drifting. No. 3 level, 125 feet below No. 2: This tunnel has been driven along the vein from a point near the surface for a distance of nearly 1,300 feet. No. 4 level: A tunnel has been driven along the vein for 125 feet. The main ore-shoot was developed between the No. 2 and No. 3 levels. This shoot was 150 feet long and from 12 to 20 inches wide.

There is probably a considerable tonnage of mill-feed left between the different levels, but this can only be ascertained by extensive and systematic sampling. Recent work disclosed ore under the timbers of an old raise connecting the No. 1 and No. 2 levels. From the No. 3 level ore was stoped from the north-east end, and there are still several small showings of good-grade ore in this part of the workings. The No. 4 level is in good-looking ground, but the ore so far encountered carries a high percentage of zinc. Owing to the character of the ore careful sorting has to be resorted to, that high in zinc being discarded. The development-work done in the past consists principally of drifts along the lead, and it would seem apparent from the nature of the deposit that not sufficient crosscutting across the shear-zone has been done.

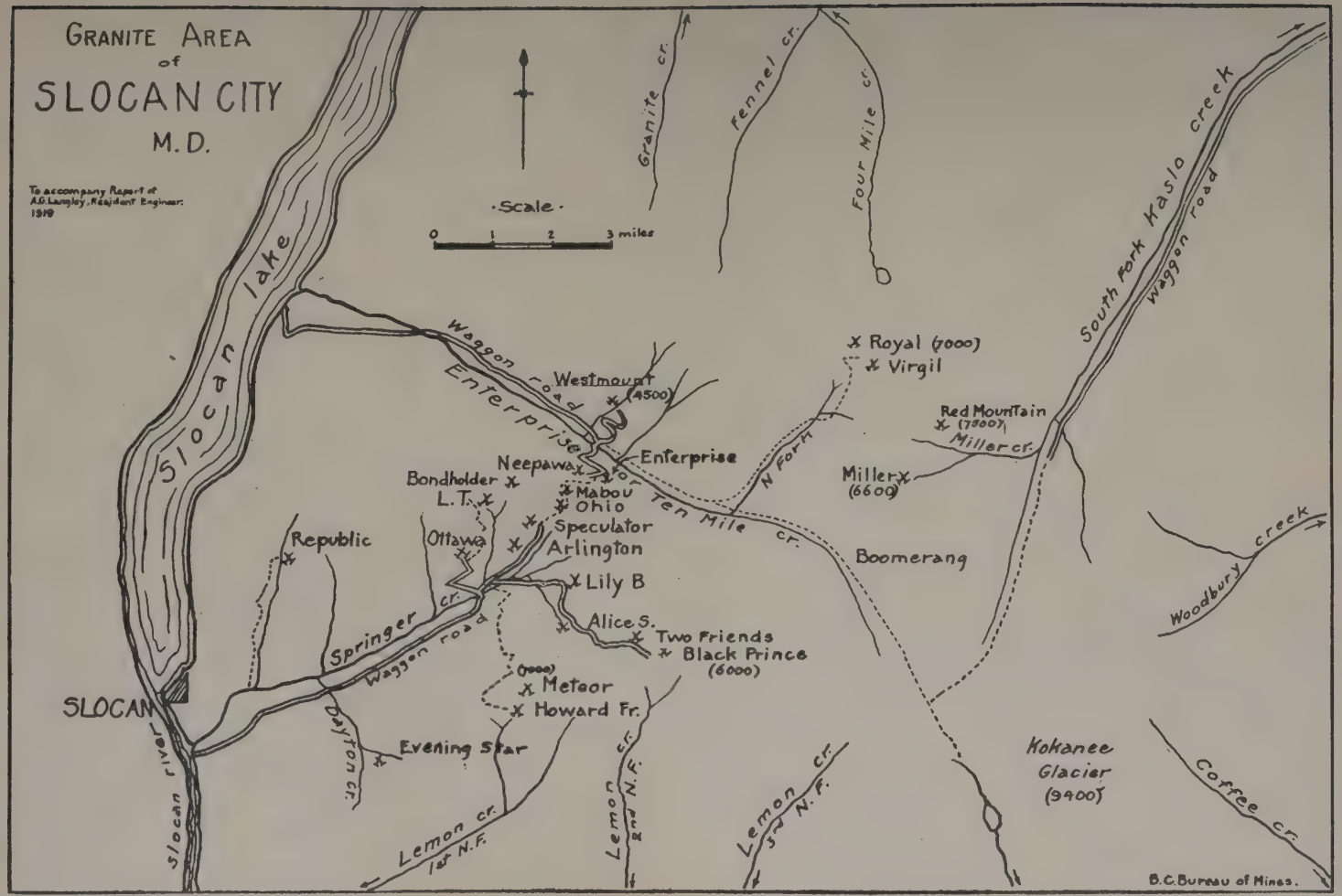
Westmount.

This property is situated on Enterprise creek at a distance of eight miles from Slocan lake and has produced a considerable tonnage of high-grade silver ore. It was worked continuously from 1905 to 1914. In the early nineties work was first started by F. Griffiths, the original owner. At this time the hillside was well covered by overburden supporting a heavy growth of timber and underbrush, and the vein only outcropped at one place near the portal of the No. 1 tunnel. Here the indications could not have been very encouraging, for the small showing of ore near the surface, consisting of an intimate mixture of iron pyrites, zinc-blende, and a little galena, was not of commercial value, and it was only after drifting for over 100 feet that the pay-streak of high-grade ore was encountered.

This drift is worthy of special mention, for one seldom sees such a good example of timbering in prospect-tunnels. The timbers and track, which were put in twenty-three years ago, are in good condition and in perfect alignment to-day. To give an idea of the values obtained the following may be of interest: The average value of fifty-two car-loads ran: Gold, 0.049 oz.; silver, 169.82 oz.; lead, 9.39 per cent.; zinc, about 20 per cent. Some of the shipments made went as high as: Silver, 438 oz.; lead, 12.9 per cent.; zinc, 20.5 per cent.

The main vein is from 3 to 6 feet wide; the filling consists principally of decomposed granite, with quartz varying from a few inches to 2 feet in thickness. The ore is invariably found to be associated with the quartz-filling. The character of the ore varies in different parts of the vein; in places the high silver values are associated with galena, in the form of tetrahedrite, and ruby-silver, while in others the predominant minerals are tetrahedrite associated with zinc-blende and native silver. Except in the high-grade streaks, the ore is an intimate mixture of iron pyrites, zinc-blende, and a little galena.

The formation is of granite, similar in character to that found in the region surrounding Springer and Enterprise creeks; it is easily recognizable by large phenocrysts of feldspar. From observations in the field, the dark basic dykes which intrude this granite area in many cases


GRANITE AREA
of
SLOCAN CITY
M. D.
To accompany Report of A.G. Langley, Resident Engineer. 1919
Scale
0 1 2 3 miles
Granite cr.
Fennel cr.
Four Mile cr.
South fork Kaslo creek
Waggon road
Slocan lake
Waggon road
Enterprise
Westmount (4500)
Enterprise
Ten Mile cr.
N fork
Royal (7000)
Virgil
Red Mountain (7800)
Miller cr.
Miller (6600)
Neepawa
Bondholder
L.T.
Mabou
Ohio
Speculator
Arlington
Lily B
Republic
Ottawa
Springer cr.
Waggon road
Alice S.
Two Friends
Black Prince (6000)
Meteor (7000)
Howard Fr.
Evening Star
Dayton cr.
SLOCAN
Slocan river
Lemon cr. 1st N.F.
Lemon cr. 2nd N.F.
Lemon cr. 3rd N.F.
Boomerang
Woodbury creek
Kokanee Glacier (9400)
Coffee cr.
B.C. Bureau of Mines.

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apparently are responsible for the faulting of the vein system, the throw usually being in a northerly direction.

The mine is developed by four adit-tunnels. The richest ore was extracted from the small cross-veins near their intersection with the main vein on the No. 2 and No. 3 levels. The largest ore-body was mined between the second and third levels. Not much ore has been developed on the No. 4 level. The No. 2 level has been extended some 300 feet beyond where the ore was encountered, but did not prove any further ore-body in this direction. The hanging-wall on this level is not well defined and in places is composed of crushed and decomposed granite, with small feeders of quartz, seams of calcite and talcose material, conditions which would appear to warrant more crosscutting on this side of the vein. At some 200 feet from the end of the drift a basic dyke crosses the vein, and at this point the drift follows the dyke for a short distance and then continues in the direction of the strike of the vein in barren ground. The reasons for doing this latter work are difficult to understand.

The present work, which is being done by H. D. Lea and associates, who have a lease on the property, consists of stoping between the third and fourth levels. During the year three car-loads of ore was shipped to Trail. The ore occurrence and the geological conditions at this property are certainly of great interest and the best part of a week could be spent on the ground to advantage.

Neepawa.

This group, comprising five claims—*Trio*, *Boisevan*, *Neepawa*, *Edith*, and *Mervin Fraction*—is situated at a distance of eight miles from Slocan lake, on Enterprise creek, and at an elevation of 4,500 feet. According to old records, the mine has been intermittently operated, principally by leasers, since the early nineties, during which period some $50,000 worth of ore has been extracted. The property was acquired this year by the Delia Mines, Limited, of which J. S. Lamb, of Vancouver, is president and E. F. Roche manager and secretary-treasurer. During the year only two or three men were employed at mining and cleaning out the old workings. According to the manager, plans have been formulated for development on a large scale, including the ultimate erection of a 200-ton concentrator, tramway, power plant, etc. The large bunk-house of the adjoining property—namely, the *Enterprise*—has been bought by the company.

The property was visited on the writer's return from the headwaters of the North fork and the time at his disposal only allowed a somewhat hasty examination. The *Neepawa* vein occurs in a sheared fissure in the granite, dipping at an angle of about 60 degrees to the east and having a northerly and southerly strike. This shear-zone, which apparently terminates at Enterprise creek, can be traced in a southerly direction to the *Arlington* mine, at which place it is wider and more pronounced. The ore, occurring in quartz veins and stringers—in the crushed and decomposed granite-filling of the fissure, is apparently a finely crystalline mixture of sulphantimonates of silver, with which is associated zinc-blende and galena. Good silver values are often obtainable in vein-matter which to the eye resembles lean or barren material; hence, in walking through the underground workings, it is impossible to form an idea of the possible values without taking numerous samples.

The mine has been developed by four adit levels driven into the steep hillside and the underground workings are quite extensive. The best shoot of ore is said to be between the third and fourth levels. In an intermediate between these levels the ore is exposed for a short distance in the roof of the drift, and in order to get some idea of the character and value of the ore at this point a sample was moiled across a width of 30 inches, which gave the following results: Silver, 17.5 oz.; lead, 2.5 per cent.; zinc, 12.5 per cent.; gold, trace.

To form any definite idea of the available tonnage suitable for mill-feed the property would have to be carefully surveyed and an assay plan prepared. The amount of ore which is recognizable in various places, upon taking a trip through the mine, does not convince one that a sufficient tonnage has been developed to warrant a large expenditure on mill-construction, power plant, etc. However, the management is evidently satisfied on this point, and if operations are successful it will do a lot to help this part of the district. Considering the present high price of silver, it would appear to be a property which, under careful and competent management, might be made a profitable producer without it being necessary to take any undue risk in making a large capital expenditure.

Mabou and Ohio Group.

This property, comprising four claims—*Mabou*, *Ohio*, *Empress Fraction*, and *Summit Fraction*—is owned by R. Kirkwood and associates and is situated on Enterprise creek, adjoining and to the south of the *Neepawa*. R. Kirkwood, who is one of the pioneer prospectors of the Kootenays, became interested in this part of the district as early as 1894, when he located the *Enterprise* mine, and from which a large tonnage was shipped in the early nineties. Prospecting-work has been intelligently and systematically carried out on the *Mabou* vein, but unfortunately the workings, which have been idle for about ten years, are nearly all caved in, and hence are of little assistance in helping to form an idea of the possibilities of the property. The workings commence at an altitude of approximately 5,300 feet, or 1,800 feet above the road on Enterprise creek, and extend up the steep slope of the hillside towards the summit of the ridge.

Besides a number of open-cuts along the strike of the vein, there are three adit levels, of 75, 50, and 15 feet in length respectively. The formation and ore occurrence is similar to that of the *Neepawa*, and apparently the vein lies in the same zone of shearing. A grab sample from a 2- to 3-ton pile of ore at the portal of the No. 3 tunnel, which is 75 feet in length, ran as follows: Gold, trace; silver, 22.5 oz.; zinc, 7.5 per cent.

At a short distance above the cabin the trail to the summit passes the portal of a 75-foot tunnel driven on the extension of the *Enterprise* vein, which has a strike of S. 55° W. and a dip of from 70 to 80 degrees to the south-east. The ore here is of a distinctly different character to that of the *Mabou* vein, and consists of a fairly coarse-grained galena, with which is mixed varying quantities of zinc-blende. A sample of the cleanest-looking ore from a pile of 3 or 4 tons at the portal of the tunnel ran as follows: Gold, trace; silver, 266.2 oz.; lead, 18.5 per cent.; zinc, 17 per cent.

Both the *Enterprise* and *Mabou* veins are said to be traceable to the *Ohio* claim, which adjoins the *Mabou* to the south. On this latter claim a considerable amount of work was done many years ago, but here again the most important workings are caved. It is difficult to form an opinion of the property without knowing the record of the work done and the results obtained, but it would appear to be good prospecting-ground. It seems a pity that in so many cases where conditions seem favourable for further exploitation the workings are allowed to cave and open-cuts to become filled up. In many cases this not only makes it more difficult for an examining engineer to form an opinion of the property than if nothing had been done, but also militates against the possibilities of interesting capital.

Riverside Group.

This group, comprising four claims—*Alameda*, *Riverside*, *Autumn*, and *Lailey Fraction*—is owned by R. Kirkwood and is situated on the summit of the ridge on the southerly side of Enterprise creek and at a distance of about two miles beyond the end of the wagon-road. At present there is no direct trail from the creek, but the property is easily accessible from the main trail between the creek and the Arlington road. A small quartz vein occurs in a sheared fissure in the granite which has been traced down the steep hillside towards the creek, and at vertical intervals of 200 feet has been prospected by means of three adit levels. The quartz vein, having a south-westerly strike and a dip of 70 degrees to the south-east, is small and its continuity is not well defined, but in places contains small pockets of fairly high-grade silver ore.

The upper or No. 1 tunnel has been driven for a distance of 120 feet along the strike of the vein. A sample taken from a pile of about 2 tons extracted from this tunnel ran: Gold, trace; silver, 87.5 oz.; zinc, 7.5 per cent. The No. 2 tunnel has been driven for a distance of 200 feet and the No. 3, or lowest, for a distance of about 40 feet. The ore is a "dry ore," the principal values being in silver, which is associated with zinc-blende, iron pyrites, and in places a little galena.

Boomerang.—Situated on Enterprise creek at a distance of about two miles beyond the confluence of the North fork. There is reported to be a nice showing of high-grade silver ore at the bottom of a shallow shaft. Further work is being done by Franz Bros. to prove the continuity of the ore by crosscutting.

THE NORTH FORK OF ENTERPRISE (10-MILE) CREEK.

The topography of the region at the head of this creek is typical of that of many creeks which form the drainage system of the granite areas. The basin in which the creek has its source, at one time probably the resting-place of a glacier, is park-like in appearance, the

greater area being grassy meadow land, through which the creek meanders, forming small ponds at intervals. The surrounding scenery is both rugged and picturesque. Granite bluffs rising abruptly to about 1,000 feet form the sides of the basin, presenting a fairly even sky-line, only broken by an occasional bare and precipitous peak rising for 2,000 or 3,000 feet above the timber-line.

The particularly interesting feature regarding the geology of this area is that narrow bands of steeply tilted sedimentary rocks made their appearance as inclusions in the granite batholith on the east side of the basin, forming several low passes to that section of country surrounding the headwaters of the South fork of Kaslo Creek. These bands, which become more pronounced as the creek-valley is approached, consist of pyritized slates, schists, and limestone. The original iron sulphides, having been oxidized, have imparted a red hæmatite colouring to the schists which can be distinctly seen for miles. A little prospecting has been done at various places in these sedimentary rocks near the granite-contact and mineral has been found, but not enough work has been done at any one place to prove sufficient ore to be considered of commercial importance. Nevertheless, it is an area worthy of careful investigation by the prospector.

Royal Group.

This group, comprising two claims, is situated at the head of the North fork, at a distance of seven miles by trail from the end of the wagon-road on Enterprise creek. The elevation of the cabin is about 7,000 feet. The metallic contents of the ore are principally in grey-copper, with which is associated a little ruby-silver and some argentite. The mineralization has taken place in a small quartz vein, is pockety in occurrence, and nowhere greatly exceeding 6 inches in thickness. The quartz vein, varying from a few inches to about 1 foot in width, has been formed along a sheared fissure in the granite and has a strike of N. 10° W. The vein is persistent and well defined.

An adit driven along the strike is in about 250 feet, and if continued for a few feet farther would strike daylight on the other side of the ridge. A 60-foot raise has been driven 156 feet from the portal. From these workings some 17 tons of ore has been extracted; of this, 7 tons was shipped in 1904. A sample taken across a width of 4 inches at the face of the tunnel ran: Gold, 0.08 oz.; silver, 18.5 oz.; zinc, 1.5 per cent. A sample across a width of 4 inches in a small stope near the end of the tunnel ran: Gold, 0.02 oz.; silver, 58.5 oz.; zinc, 1.5 per cent. A grab sample from a 10-ton pile of sorted ore for shipment ran: Gold, 0.02 oz.; silver, 118.5 oz.; zinc, 4 per cent. The steep pitch of the hillside down which the vein can be traced affords good tunnel-sites for development at greater depth, and conditions would appear to warrant further prospecting being done in this direction.

Virgil and Christina.

These claims were staked many years ago by Mike Murphy, of Kaslo, who built a cabin and did a considerable amount of prospecting-work, but latterly little has been done and the workings are not in very good shape for examination. The claims are located on the granite ridge which forms the divide between the North fork and 4-Mile creek at an elevation of approximately 7,500 feet. The vein, having a north-westerly strike, is a fissure in the granite and similar in character to that of the *Royal* group. It can be traced up the face of the granite bluff to the summit of the ridge. Good silver values are said to be obtainable at intervals over a length of 1,000 feet along the strike of the vein, but this could not be confirmed at the time, neither were the old tunnels driven into the face of the bluff for 12 and 30 feet respectively in condition for examination. M. Murphy, who was at the property, stated that he expected to do further work this year.

Red Mountain Group.

Leaving the basin of the North fork of Enterprise creek and proceeding in an easterly direction over the divide, one arrives at the headwaters of Miller creek, which flows into the South fork of Kaslo creek at a distance of about sixteen miles from Kaslo. On the north side of Miller creek the pyritized sedimentaries, which come in close contact with, and occur partly as inclusions in, the granite, form a zone some 300 feet in width; a distinct red colour due to oxidation is noticeable. Near the summit of the ridge on this zone two claims have been staked—*Red Mountain* and *Red Mount*—at an altitude of 7,550 feet. On the surface there are little (if any) indications of vein-matter, but no doubt sufficient were found to lead to the staking of the claims and the location of the present diggings. In an open-cut resembling a series of steps in the steep hillside a small quartz vein has been uncovered, lying conformably with the dip and strike of the formation.

At a few feet below the surface a small pocket of highly enriched oxidized ore was encountered. This ore is of a black earthy character, commonly known as "black sulphurets," although it is probable that the high silver values are in the form of silver chloride. A sample across a width of 6 inches of this ore ran: Gold, 0.04 oz.; silver, 514 oz. A sample of reddish oxidized material ran: Gold, 0.04 oz.; silver, 40.5 oz.; zinc, 6 per cent. Below this pocket the vein is nothing more than a quartz stringer; only a small section of it has been so far exposed.

The concentration of high silver values at this one place is evidently due to enrichment by surface waters. Conditions do not at present warrant any extensive outlay of capital, but more surface work might be done to advantage in an effort to trace the origin of the ore. The property is owned by R. Ainslie and D. McCuaig, of New Denver.

Profit-Miller Group. Situated at the head of Miller creek at a distance of two miles from the South fork of Kaslo creek. The property is owned by R. Ainslie and D. McCuaig. Very little work has been done on the property. The general geological conditions are complex, due to faulting, shearing, and contacts between the sedimentaries and the granitic rocks. At this particular place there is a shear-zone on the hanging-wall side of which there is a 2-foot streak of talc gouge; on the foot-wall side 6 or 8 inches of ore is exposed in places in a quartz vein. A sample of this ore ran: Gold, 0.08 oz.; silver, 15.9 oz.; lead, 18 per cent.; zinc, 21 per cent. Before spending any large sum of money it would be advisable to prove the existence of ore in sufficient quantity to be of economical importance by the means of surface work or the continuation of the present tunnel.

NELSON MINING DIVISION.

Eureka. This property, which is situated on Eagle creek at a short distance from Nelson, was acquired by the Inland Mining Company, of Walla Walla, in August, 1918. The *Granite-Poorman* mill was leased, and development at the mine was continued by advancing the main drift in a southerly direction, where a considerable tonnage was developed. Latterly the company took over the *Granite-Poorman* mine and mill. The long crosscut is now being continued at the *Eureka* to tap the vein below the present workings. The mill, which is equipped with 20 stamps and designed for the *Granite-Poorman* gold ore, is being remodelled with a view of making it adaptable for treating the ores of both the *Eureka* and *Granite-Poorman*.

A progressive programme of mining and development work has been planned, and will be carried out under the supervision of J. Clarke Johnstone, the mining engineer in charge. The operating company is called the Vincent Development Company.

Yankee Girl. Situated at Ymir. Under the management of W. T. McDowell this mine was one of the largest producers in the Division during 1918, but ceased production during the present year, probably owing to the fact that the values are not high enough to allow mining to be carried on under present economic conditions. Presumably it is only a matter of time for financial arrangements to be made for the erection of a concentrator, which is necessary for the future success of this property. There is reported to be ample tonnage available to warrant this additional expenditure. The principal values are in gold, and the production of this mine last year was responsible for an increase in the gold production of this Division.

A great deal of interest has been taken in the exploratory work being done on Sheep creek, the success of which means so much to this camp in particular, and to the gold production of the district in general.

Emerald.—A small concentrator is being erected at this mine. Steam-power will be used. The mine, which in recent years has been the only silver-lead producer in the Sheep Creek district, is one of the pioneer properties, and has shipped in the past about 50,000 tons of crude ore. The ore carries a high percentage of lead, low silver, and zinc values varying from about 6 per cent. upwards.

Second Relief.—Situated near Erie. The mill and mine buildings were completely wiped out by bush fires during the summer months. Efforts are now being made by A. D. Westby, the manager, to reorganize the company with a view of acquiring sufficient capital to rebuild the plant. The values are in gold.

Spokane Group.—Situated on Canyon creek, in what is known as the Bayonne district. Laib Bros. have been actively engaged in developing the property during the season, and

according to reports have built a small arrastra. The values are in gold and silver, the gold predominating.

Molly Gibson.—Situated at the head of Kokanee creek in the granite area to the north of the West arm of Kootenay lake. This mine is one of the steadiest producers in this Division and for the year was the largest shipper. The property is owned and operated by the Consolidated Mining and Smelting Company.

California. This mine, originally owned by W. H. Moore, of Nelson, was acquired in 1916 on a bond by the California Mining Company, with registered office at Nelson. The officers of the company are: J. R. Cassin, of Spokane, president; W. R. Orndorff, secretary-treasurer; and W. H. Turner, manager. The property consists of five claims —*California*, *Union*, *Deadwood*, *Cliff*, and *Gold Ring*—situated on Toad mountain at a distance of three miles south of Nelson. During the last four years the development-work has been systematically carried on under the superintendence of W. H. Turner, with the object of blocking out sufficient ore to warrant the operation of a concentrator. In order to facilitate the work the compressor at the *Athabasca* was leased and 4,000 feet of pipe-line laid to the mine.

The vein is a quartz-filled fissure occurring in a band of schists near a granite-contact. It shows persistence in strike and dip, and by means of underground and surface work is found to be continuous for some 1,000 feet along the strike. It has a distinct banded structure and has been formed along a line of shearing, as evidenced by the slickensided rock surfaces. The dip of the vein is 52 degrees to the south and the strike S. 80° W. The width varies from 5 to 10 feet. The ore occurs in long narrow shoots. The principal values are in gold, the associated minerals being iron pyrites, zinc-blende, and a little galena. The highest gold values are generally found to be associated with the zinc-blende. The gangue is quartz.

The vein is developed by three adit levels. The No. 1 level is a drift along the vein, from which ore has been stoped to the surface. This level is now caved. The No. 2 level has been driven 106 feet vertically below No. 1. The length of the level is approximately 627 feet. Here the vein has been drifted on for 206 feet; five car-loads of ore shipped from this level are said to have carried values of from $17 to $26 in gold, about 30 per cent. of which was in the free state. There is a considerable quantity of ore available for milling in this level. The No. 3 level gains a vertical depth of 170 feet on the No. 2. This level has been driven by the company, and followed a barren vein for 1,200 feet, when it intersected the *California* vein. This latter was drifted on for about 300 feet, showing a width of from 3 to 5 feet. Across this width the average of numerous samples taken by the manager indicate favourable possibilities of winning a considerable tonnage of $17 ore from between this level and the No. 2.

During the year arrangements were completed for the leasing of the *Athabasca* mill, and one mile of road was built connecting the two properties. The mill is being remodelled, and it is anticipated that the mine will enter the list of producers in the near future. The systematic and conservative manner in which the development of the mine has been carried out reflects credit on the management.

Jackpot Group. The old prospect-tunnels and shaft on this property, which are situated in close proximity to the well-equipped mill and camp of the Baskin-Steadman Lumber Company, are now engaging the attention of M. H. Baskin, who proposes to systematically explore the ground with a view of finding out the why and wherefore of the old workings. At present there is not very much to go on, except the favourable location and indications of ore in good-looking ground. There are four claims in the group, which are staked along the probable extension of the *Hardscrabble* vein. The elevation of the present workings is approximately 3,550 feet and the distance from the railway is about two miles.

The old prospect-tunnel is driven in a direction of S. 20° W. for 115 feet, gaining little backs in this distance. At a short distance from the portal a body of crushed material high in silica and stained with oxide of iron was cut by the tunnel. In places the crushed quartz is stained with copper, but no ore of economic value is disclosed. Beyond this point the tunnel is in barren unaltered country-rock composed of diorite grading into a highly siliceous granite. At a distance of about 500 feet to the south-east an old shaft has been sunk on a quartz vein. A grab sample from a small pile of ore, consisting of quartz mineralized with chalcopyrite and iron pyrites, ran: Gold, 0.04 oz.; silver, 1 oz.; copper, 2.8 per cent. The shaft was partly filled with water, hence could not be examined.

Mother Lode. This property, comprising a group of eight claims, is situated on the northerly side of Sheep creek at a distance by road of eleven miles from Salmo. The claims were first located by Thos. Bennett and H. M. Billings, both pioneer prospectors of the Sheep Creek district, and to whom belongs the credit of many valuable locations in this district. Mr. McMartin, of Cobalt, was responsible for the progressive development of the property. After doing a certain amount of preliminary development at the mine a 100-ton concentrator was erected below on Sheep creek. This plant, embodying the very latest in mill design, was completed in 1912. Briefly, the equipment consisted of a battery of 10 stamps, tube-mill, amalgamation-plates, and complete Merill cyanide plant. Water-power for the mill and mine was derived from Sheep creek, and is capable of developing about 400 horse-power. The savings are said to represent 95 to 98 per cent. of the values. The plant, with the accompanying buildings for the employees, at once gives the impression that it was laid out and built under the supervision and design of an experienced and competent engineer. A Leschen tramway 3,600 feet in length connects the mill with the mine-workings, which are situated on the mountain-side at an elevation of 2,098 feet above the mill.

A total of about $279,000 was spent on the erection and equipment of the buildings and plant at the mine and the mill, exclusive of large expenditures for the purchase of property and development-work. The operations covered a period of about four years—namely 1912 to 1915—during which, up to the end of August, 1914, the operating profits amounted to $163,617.30.

During 1918 the Nugget Gold Mines, Limited, formed an amalgamation between the *Motherlode* and the adjoining property of the *Nugget* group, the principal object being to develop the *Nugget* vein by means of a long crosscut from the lower workings of the *Motherlode*, which would not only allow economical working of the *Nugget*, but would also allow the use of the *Motherlode* mill on Sheep creek. The crosscut, which will have a length of about 1,200 feet, was started from the No. 5 level of the *Motherlode* and is now nearing its objective, although a shortage of water during the season seriously impeded the progress. This crosscut should tap the *Nugget* vein about 640 feet below the workings. The work is being done under the supervision of R. H. Stewart, consulting engineer. Harold Lakes is in charge at the mine.

The main vein of the *Motherlode* is characteristic of the veins of the Sheep Creek district, which are quartz-filled fissures cutting the enclosing schist and quartzite formation. The experience has been that where they traverse the quartzite gold values are obtainable, but in the schist the values are negligible. This is true in the case of the *Motherlode*, all the ore being developed where the vein traversed the quartzite formation. In this connection it is of interest to note that the most westerly ore-shoot in the *Motherlode* occurred in a band of quartzite which can be traced to cut the *Nugget* vein at one of its most productive points. The most easterly band of quartzite in the *Motherlode*, from which ore was developed, has not yet been explored in the *Nugget* workings.

The general strike of the veins is westerly and cuts that of the enclosing formation at an oblique angle. The dip varies from 70 to 80 degrees. The general strike of the formation is N. 20° E. and dip 67 degrees to the south-east. The vein, which has been developed by a series of crosscuts from the surface, has had its values stoped out to the fifth level, below which conditions did not appear to warrant the driving of another long crosscut in order to gain additional depth on the vein. The ore is a gold-bearing quartz, rusty in colour, and more or less decomposed. The original iron sulphides, having been oxidized, have left the gold mostly in the free state.

Nugget Group. This group, comprising seven claims, was originally staked and operated by W. B. Poole. The property adjoins the *Motherlode* to the north and has been developed from the opposite side of the ridge. The mine-workings are at present reached by a trail, which, following the valley of Fawn creek for about three miles, connects with the Salmo road. During a period extending from September, 1908, to September, 1911, some 14,000 tons of ore was milled, from which was recovered about $220,000 in gold. The tailings loss was from $3.50 to $5.50 per ton, hence the gross value of the ore was about $20 a ton.

The amount of underground development-work done up to the end of 1911 was 5,800 feet. All underground work was done by hand and the ore was treated in a 4-stamp mill, which was largely dependent on steam-power for operation. The timber in the vicinity of the mill is small,

so it was not long before the fuel-supply became scarce and the length of haul prohibitive for successful operation.

There are five known veins on the *Nugget* ground; the principal one, on which most of the work has been done, is the *Nugget* vein. This vein, having a dip of about 80 degrees to the south and a strike of N. 70° E., varies greatly in width, but shows an average of about 5 feet. It has been developed by four adit levels to a depth of 450 feet below the apex, at which depth oxidized ore carrying free gold has been proved. The veins and formation are similar in character to those at the *Motherlode*. Based on the assumption that the values in the *Nugget* will continue with depth, and that considerable ore can be won from the upper workings, the proposition is an attractive and legitimate mining enterprise.

Unfortunately, the work done by A. W. McCune at the *Queen* mine did not come up to expectations and the project has been abandoned. A tunnel was driven for approximately 1,600 feet; at 700 feet from the portal the *Yellowstone* vein is said to have been cut. This was drifted on for about 200 feet, but little values were found. Although this tunnel does not develop ore, neither does it condemn the property, in the opinion of those thoroughly familiar with the ground.

Reno-Donnybrook Group.

This property, consisting of sixteen claims, is located at the head of Fawn creek at a distance of about one mile to the north of the *Nugget*. W. B. Poole, who is one of the principal owners, put in a season's work at prospecting a new lead, which runs parallel and at a short distance from the *Reno* vein. The formation belongs to the same geological series as that of the Sheep Creek area, in which gold quartz has been mined at the *Motherlode*, *Queen*, and other properties, but there is greater evidence of intrusive igneous rocks.

The elevation of the claims ranges from about 6,000 to 7,000 feet. The surface of the hillside is well covered with a depth of about 2 feet of overburden, necessitating the digging of numerous open-cuts and trenches to expose the veins. This work has been systematically done, enabling the veins to be traced for well over 1,000 feet towards the summit of the ridge.

The veins are quartz-filled fissures similar in character to those of the Sheep Creek camp. Enriched pockets occur, but the values seem to be fairly persistent along the length of the vein, the best being found where the vein loses in width, which is particularly applicable to highest portion of the vein. At the lower levels the vein is wider, but carries less values. The ore is rusty-coloured and more or less honeycombed quartz. The values are in free gold, and an average of a number of samples would indicate the ore to run about $20 a ton. Native gold is visible to the eye in many of the picked specimens.

It would appear to be a property which has good possibilities, worthy of careful investigation with a view of bringing it to that stage of development where the requirements would amply justify the necessary expenditure for mill-construction and accessory equipment.

Bunker Hill Group.

This property comprises three claims owned by Mrs. Bertha Cameron, of Victoria, and is located at a distance of seven miles from the Erie road at Green City. One day was allowed for the trip, which time might have been sufficient had the writer been accompanied by any one who was thoroughly familiar with the ground; as it was, we found all the old trails long since obliterated, and the old camp-site presented nothing more than a wilderness of underbrush. Near where at one time there was evidently a cabin a few open-cuts had been made to explore the ground under a thin capping of oxidized material, but there was not much to be seen, as they were partly filled with dirt and nothing resembling ore had been extracted.

At a short distance from these diggings an open-cut had been made at the side of a small creek. Here the country-rock has been mineralized with iron sulphides in the form of pyrrhotite across a width of 30 inches. A sample across this width gave no values in gold or silver. From the bottom of this cut a shallow shaft had been sunk and a few tons of pyrrhotite extracted. At the time of the visit this shaft was full of water. The formation consists of igneous rocks of the Rossland volcanic series. There are said to be other showings on the property worthy of examination; hence another trip will be arranged during the coming season if possible.

Iva Fern Group.

This property, consisting of seven Crown-granted claims, is situated on Cultus creek at an approximate distance of seven miles from Kootenay lake. There is a good trail from the lake-shore to the mine, and the camp can be reached

comfortably either on foot or horseback in about three hours. The claims are staked in a northerly direction along the strike of the veins from the valley of Cultus creek to the summit of the rounded ridge lying between the North and South forks of the creek. J. Mulholland, the original owner, bonded the property to the Consolidated Mining and Smelting Company in 1918, under which bond he accepted a contract to drive a crosscut tunnel and altogether do some 700 or 800 feet of underground work. The mine cabins consist of a bunk-house and cook-house with accommodation for about eight men; there is also a small blacksmith-shop at the tunnel and another cabin on the creek at the foot of the mountain trail which is used as a storehouse.

The surface of the mountain in the vicinity of the workings is covered with a depth of from 3 to 6 feet of overburden and few rock-exposures are visible. The formation in which the ore has been found, consisting of steeply tilted and highly metamorphosed rocks of sedimentary origin, has been intruded in the vicinity of the veins by a basic lamprophyre dyke, which may be genetically connected with the ore-deposits.

The surface work has so far been confined to an area near the summit of the ridge, and although the vein is said to have been traced down the hill, little work has been done at lower altitudes. Long shallow trenches dug across the strike of the formation disclose the rock in-place, which near the surface has been subjected to highly oxidizing agencies; the dyke-rock is decomposed and there are wide zones of broken material stained with oxide of iron. Besides oxidized and decomposed ledge material, small quartz stringers carrying ore are the only indications of the vein or veins in these trenches.

Near the summit of the ridge, at an elevation of about 6,300 feet, a 10-foot shaft has been sunk on the No. 2 vein. At this point there is a wide exposure of oxidized and decomposed material in which ore occurs in streaks and bunches. On the foot-wall side at the bottom of the shaft the ore shows a width of 2 feet, but the shattered condition of the enclosing rocks is not convincing as to its continuity. The vein conforms to the stratification of the formation, the dip being almost vertical and strike north and south. From this shaft 3 or 4 tons of ore has been extracted, a grab sample of which ran: Gold, 0.04 oz.; silver, 4.2 oz.; copper, 3.5 per cent.; lead, 26 per cent.; zinc, 9 per cent.

Farther down the hill and in an easterly direction from the No. 2 vein a 20-foot shaft has been sunk on what is known as the No. 1 vein. At the top of this shaft the vein shows a width of about 6 feet, but the fact that the shaft was caved and partly filled prevented an examination of the bottom. A grab sample of a few tons of ore extracted from this shaft ran: Gold, 0.02 oz.; silver, 5.2 oz.; lead, 35 per cent.; zinc, 4 per cent.

It is interesting to note the difference between the ore from these two veins. That from the No. 2 vein consists of a fairly coarse-grained galena, with which is associated chalcopyrite and zinc-blende. The ore from the No. 1 vein is a steel-grain galena and carries no copper. The gangue material in both cases is composed of lime and silica.

The crosscut tunnel which is being driven by the Consolidated Mining and Smelting Company to intersect these veins is now in 252 feet, and will gain a depth of about 200 feet on the No. 2 and 125 feet on the No. 1 vein. At a distance of 200 feet from the portal two quartz stringers carrying galena were cut. The wall-rocks at this point are hard, massive slate. The last 50 feet of the tunnel is in the same material, but, judging by surface indications, softer ground will be encountered as the No. 2 vein is approached.

The No. 2 vein is the strongest and is of particular interest on account of its copper content, which possibly owes its origin to pneumatolytic processes created during the intrusions of the hornblendic dyke-rock. More surface prospecting might be done to advantage on this vein, while the continuation of the crosscut tunnel will demonstrate the possibilities at depth.

The property is still a prospect and its future depends upon the development of sufficient ore to warrant the erection of a concentrator. The indications for finding ore are favourable, but at present the probabilities of its becoming an important producer are still problematical.

McPeak Group. This property, comprising three claims, is situated on Corn creek at a distance of three miles from Kootenay flats, from whence a good trail of easy grade leads to the mine cabin. The creek-valley and adjoining hillsides are heavily timbered with cedar, hemlock, and pine. The surface of the claims is covered with overburden and no rock-exposures were visible, except in the creek-bottom, where the outcrop of the vein was discovered. The apparent direction of the vein is south-west, with a dip of 25 degrees to

Emerald Mine Ore Teams at Town of Salmo.

Alamo Concentrator, near Three Forks, W.K.

the south-east. A crosscut tunnel 130 feet in length was driven to tap the vein below the outcrop in the creek-bed. Ten feet from the end of this tunnel vein-matter was encountered, and a 20-foot drift to the north-east discloses some greenish calcareous rock, probably dolomite, sparsely mineralized with chalcopyrite and iron pyrites, but evidence of any well-defined vein is lacking. The tunnel only gains about 20 feet of backs below the outcrop.

At a distance of about 40 feet to the west of the outcrop a prospect-tunnel driven at right angles to the vein struck a pocket near the surface, from which about 2 tons of ore was extracted. A sample of the sorted ore from this tunnel ran: Gold, trace; silver, 4 oz.; copper, 3.5 per cent.

The ore is chalcopyrite, with which is associated iron pyrites, zinc-blende, and a little galena. The gangue is principally quartz. The formation consists of slates and schists, probably of Pre-Cambrian age. The development-work done so far is not sufficient to allow much importance to be attached to the deposit.

Great War Group.

During 1919 this group, consisting of a long string of about forty claims, was staked by G. A. M. Young, of Creston, on behalf of the British Columbia Iron Company, Limited. They extend for about a distance of three miles in a northerly and southerly direction on either side of the Canadian Pacific Railway at a point three miles west of Kitchener. The area is composed of the Pre-Cambrian rocks of the Aldridge formation, which come under the general classification of dark-grey argillaceous quartzites, weathering to a rusty-brown colour. Igneous rocks, described as the Purcell sills, and varying in composition from hypersthene gabbro to a very acid granite, have been injected between the horizontal strata of the Purcell series and are of common occurrence in the Aldridge formation. Contemporaneous to the sill-rocks there were flows of lava composed of highly altered amygdaloidal basalt. In a belt of rocks extending in a northerly direction from the summit of the Moyie range for a distance of six or seven miles up Goat river to the Kitchener iron-deposits, indications of iron ore have been discovered at various places.

Superficial prospecting-work was done on the Kitchener deposits some years ago, with the result that five beds of hæmatite were said to be uncovered, having widths of 8, 12, 18, 15, and 6 feet respectively. The average assays of a number of samples taken is reported to have given 50 per cent. metallic iron, with negligible quantities of sulphur and phosphorus. Although there is said to be a large tonnage, it is understood that not sufficient work has been done to allow an estimate being made of the amount available.

It is further reported that the ore occurs in quartzite, running north and south throughout the length of the mountain alongside a greenstone dyke. (*See* Minister of Mines' Report, 1901.) At the southern extremity of this mineralized belt, near the summit of the Moyie range, the present discoveries on the *Great War* group have been recently made.

Prospecting-work carried out under the direction of G. A. M. Young consists of stripping the surface free from the heavy overburden of detritis. The principal and probably the most important work has been done near the point of discovery. These workings are situated at a distance of three miles from the railway-track and at an elevation of 6,000 feet. With the exception of the one place at which the ore was discovered, no exposures of the ledge were formerly visible, for the rock in-place is heavily covered with overburden, making prospecting slow and costly.

The workings are as follows: The No. 1 cut, which is the most southerly, consists of a deep trench 50 feet long across the apparent strike of the ore-body. The rock surfaces are exposed, but no ore was encountered. At the No. 2 cut, which was driven in the same direction and at a distance of about 100 feet north of the No. 1 cut, similar conditions prevail. The rock exposed along the bottom of the cut is a diorite superficially stained with iron oxide. Black hæmatite float has been found near these workings, indicating the presence of a vein farther up the hillside. At a short distance to the north of No. 2 another cut has been made; this runs in a northerly and southerly direction, exposing a face about 52 feet long and 10 feet high. The longitudinal section of this from the southerly end exposes a band of soft black hæmatite 4 feet wide and 12 feet long, gradually passing into a hard black crystalline ore and becoming disseminated through a tough, fine-grained light-green rock carrying a certain percentage of iron pyrites.

Two samples were taken, one along the 12 feet of soft ore and the other was chipped from the surface of the remainder of the face for a length of 38.5 feet. The sample of the soft ore ran: Metallic iron, 52 per cent.; sulphur, trace; phosphorus, trace. The other sample ran:

Metallic iron, 42 per cent.; sulphur, 2.63 per cent.; phosphorus, 0.04 per cent. The silica content was not determined, but judging from the character of the ore, it would be high in the latter sample.

Continuing down the hill for a distance of about 200 feet, a shallow trench uncovers a width of about 15 feet of siliceous black hæmatite, in a "tight" formation. Farther down the hill a similar exposure has been made.

"As yet, not sufficient work has been done to enable an estimate to be made of the available tonnage or even the relation between structural and stratigraphical features of the deposit to be determined. The greenstone apparently bears an important relation to the concentration of the ore, although its origin may be traceable to other sources.

From other analyses taken by the owners, the general characteristics of the ore are as follows: Black crystalline hæmatite, carrying 50 to 60 per cent. metallic iron, 20 to 30 per cent. silica, from 0.02 to 0.03 per cent. phosphorus, and about 1 per cent. sulphur. The ore is magnetic owing to its composition containing about 23 per cent. of magnetite; hence its most appropriate designation would be "magnetic-hæmatite." The ore apparently lies between diorite and quartzite, and, assuming that it is genetically connected with the igneous intrusive rock, its occurrence will probably be somewhat freakish.

Before doing any extensive development-work or diamond-drilling it would be advisable for the owners to have a magnetic survey and thorough geological exploration made of the area. The magnetic and highly silicated phases of the formation should be eliminated, and an effort made to discover areas where the formation has been loosened up and in which conditions lend themselves to ore-concentration by processes of weathering.

Sullivan Group. This property, comprising seven claims, is situated at a distance of two miles and a half from Kitchener and within half a mile of the railway. It is principally owned by J. A. Sullivan, of Kitchener. The workings are located on the hillside to the south of the track and at an elevation of about 600 feet above it. The main vein, which is a quartz-filled fissure in a hornblende diorite, has been prospected by a few open-cuts, and at a point where it was found to be most heavily mineralized a 6-foot shaft has been sunk. Across the bottom of this shaft there is a width of 3 feet of ore, composed of chalcopyrite associated with iron pyrites in a quartz gangue. A sample across 34 inches ran: Gold, trace; silver, 1 oz.; copper, 6 per cent.

The strike of the vein is east and west and roughly parallels the contour of the hillside; the dip is almost vertical. The hillside slopes at an angle of 40 degrees; hence good depth in proportion to the length of drive can be obtained by adit levels. The vein is again exposed in a trench at a distance of about 100 feet west of the shaft. Here it shows a width of 4 feet, containing an ore-streak of about 12 inches. All things considered, it appears to be a prospect upon which further work is fully warranted.

ARROW LAKE MINING DIVISION.

Millie Mack.—Situated near Burton. This property has been operated for a number of years by the owner, H. E. Forster, of Wilmer. This year there was a small crew of men working, but no information regarding the result of the season's work has yet come to hand.

Chieftain.—This property has been lying idle for some years, but as a result of an examination made by engineers it is understood that the mine will be opened up early next spring. It is situated on Cariboo creek at a distance of about twelve miles from Burton.

TRAIL CREEK MINING DIVISION.

Steady production was maintained by the Consolidated Mining and Smelting Company's mines and the *Le Roi No. 2*, the total output being about the same as that of last year.

The principal source of gold and copper in the district is derived from the mines of Rossland, and although the copper production of this camp only amounted to a little over 1,500,000 lb., that of gold was approximately 30 per cent. of the total of the Province.

The official announcement that the Consolidated Mining and Smelting Company intends erecting a large concentrator for the treatment of the low-grade Rossland ores predicts greater activity for this camp than has been experienced for some years.

In spite of the ever-increasing cost of labour and supplies—conditions which are not favourable for the economic mining of low-grade gold ore—the production for the year will compare favourably with that of last year.

At Trail many improvements have been made at the smelter, and the successful experiments made on the magnetic separation of the *Sullivan* ores have gradually led to extensive additions being made to the experimental magnetic separator plant, which now has a daily capacity of about 300 tons.

On June 24th the Consolidated Mining and Smelting Company issued Schedule C, which shows a substantial reduction in smelting charges, amounting to an average of about $3 a ton on Slocan ores.

On September 26th the company notified the mine-owners that they had decided to change their method of lead settlement by cancelling the old pooling system. The new method of settlement applied to all shipments received at the smelter on and after October 1st.

The following is Schedule C and amended terms of payment:—

"Schedule C—Payments.

"*Gold.*—Pay for 95 per cent. of the assay at $20 per ounce. No pay for gold unless 0.05 oz. per dry ton or over.

"*Silver and Lead.*—Payments for silver and lead will be based upon the zinc contents of the ore on the following schedule:—

	Silver Payment.	Lead Payment.
10 per cent. zinc or under	95 per cent.	90 per cent.
Over 10 per cent. and including 11 per cent.	94½ "	89 "
" 11 " " " 12 "	94 "	88 "
" 12 " " " 13 "	93½ "	87 "
" 13 " " " 14 "	93 "	86 "
" 14 " " " 15 "	92½ "	85 "
" 15 " " " 16 "	92 "	84 "
" 16 " " " 17 "	91½ "	83 "
" 17 " " " 18 "	91 "	82 "
" 18 " " " 19 "	90½ "	81 "
" 19 " " " 20 "	90 "	80 "
" 20 " " " 21 "	89½ "	79 "
" 21 " " " 22 "	89 "	78 "
" 22 " " " 23 "	88½ "	77 "
" 23 " " " 24 "	88 "	76 "
" 24 " " " 25 "	87½ "	75 "

"No ore containing more than 25 per cent. zinc will be accepted under this schedule.

"*Silver.*—Will be paid for to the extent shown by the above schedule on the fire assay at the average of the *Engineering and Mining Journal*, New York, quotations for the second calendar month succeeding the date of sampling at Tadanac, B.C. In no case will the deduction from the silver assay be less than 0.5 oz. per ton.

"*Lead.*—The lead contents will be determined by the wet method of analysis, deducting 1½ units to arrive at the dry-lead assay. Lead will be accounted for on the dry-lead assay to the extent shown by the above schedule; provided, however, that in no case will the deduction from the said dry-lead assay be less than 1 unit or 20 lb. per dry ton of ore.

"The price of lead to be used in settlement will be our average sales price delivered at destination in Canada for the second calendar month succeeding the date of sampling or the A. S. & R. Co.'s New York average quotation for the said second calendar month, whichever is the greater, less a deduction in either case of 1½ cents per pound for refining and marketing.

"There will be deducted also from the settlement price $2.30 per ton on sales at Toronto and common points, and $4.50 per ton on sales at Montreal and common points, and similar differentials to other points. This freight adjustment is to cover actual increases in freights; e.g., should sales in any month be 2,000 tons and, say, 1,200 tons for delivery at Toronto and 800 tons at Montreal, the freight adjustment would be three-fifths at $2.30 and two-fifths at $4.50, or $3.18 per ton of lead.

"Paragraphs (*a*), (*b*), and (*c*) on page 4 under the heading 'Settlement' are cancelled, and the following substituted:—

"'*Settlement.*—(*a.*) Shortly after sampling an advance payment of 90 per cent. of the apparent value will be made. The prices used in estimating the apparent value will be the New York price for silver of the date of sampling and the previous month's sales price for lead.

"'(b.) Shortly after the close of the second calendar month after sampling, when the data is available, the final value will be computed and any adjustment necessary will be made between the smelter and the mine.'"

Mountain Chief. Situated near Renata, on Lower Arrow lake. Development, consisting of sinking and drifting, has been steadily carried on under the supervision of J. W. Evans, the manager. A 2-bucket tram was erected early in the year, and latterly a 2-drill compressor was installed at the mine. Shipments were recently resumed to Trail. According to recent reports, present indications at the mine have fulfilled the most sanguine expectations.

REVELSTOKE AND LARDEAU MINING DIVISIONS.

Lanark. Situated at Laurie, on the main line of the Canadian Pacific Railway. Development-work has been actively carried on under the direction of W. Dornberg. The winze on the No. 4 level has been dewatered. It is reported that conditions are favourable for steady operation during the coming year and that a considerable increase in output is expected.

Beatrice. After lying idle during recent years, the *Beatrice* was opened up again and the mine-workings put in shape for further mining and development work, which, it is understood, will be carried out under the supervision of Mr. Bodine, who is familiar with the property. Four men have been working since the middle of August. The property is held under bond by a company which was recently incorporated and called the New Era Mines, Limited.

Burniere Group.—Situated near Cambourne and owned by C. Menhinick. This property is reported to have been bonded this year and that mining operations will be carried on during next year.

Waverley-Tangier Group. As early as 1896 a considerable amount of prospecting-work was done on these claims by a company called the Gold Fields of British Columbia, Limited. To give access to the property a wagon-road was built for a distance of about twenty-eight miles up the North fork of the Illicillewaet river from Albert Canyon, on the main line of the Canadian Pacific Railway. Work was abandoned many years ago, the old wagon-road became obliterated in numerous places, and it was not until last year that work was resumed by a small crew of men. The property was acquired by G. H. Walters, of Spokane, from T. Graham and O. Sandberg, of Albert Canyon. There is reported to be possibilities of opening up a considerable body of low-grade silver-lead ore. The mine is situated in the heart of a vast undeveloped country and its progress will be watched with interest, for if successful it should certainly lead to more mining activity north of the Canadian Pacific Railway line.

Woolsey Group. Since an examination and report were made on this property last year few new developments have taken place. A tunnel-site was chosen at an elevation of 5,100 feet on the west side of the creek and work was started in the fall of 1918. The tunnel has been driven along the foot-wall and parallel to the strike of the vein, which is N. 50° W., the dip being 45 degrees to the north-east. At a distance of 74 feet from the portal a crosscut has been driven, showing the vein to have a width of 23 feet. On the foot-wall side the mineralization is slight, but increases towards the hanging-wall. A moiled sample of 30 lb. taken across a width of 9.5 feet adjacent to the hanging-wall ran: Silver, 6.6 oz.; lead, 6 per cent.; zinc, 6 per cent. The gangue is quartz. At a distance of 120 feet from the portal another crosscut has been started and was just getting into the foot-wall side of the vein at the time of examination.

According to recent reports from the miners, the vein holds its width at this point and is more heavily mineralized with galena. A grab sample of a small pile of cobbed ore from the tunnel ran: Silver, 69.5 oz.; lead, 48 per cent.; zinc, 4 per cent. The formation, consisting of carbonaceous slate, is uniform in dip and strike, with the result that the vein, which conforms to the bedding-planes, has exceptionally well-defined and uninterrupted walls. So far neither on the surface nor in the underground workings is there any evidence of disturbance or igneous intrusions. The vein is a quartz-filled fissure, which is remarkable for its persistence in width and continuity. Cutting the hillside at an oblique angle, it can be easily traced for thousands of feet from near the summit on the west side of the creek to that on the east side.

Immediately above the tunnel galena outcrops on the surface, and at an elevation of 5,375 feet an old drift has been driven for a distance of 90 feet, but discloses nothing of importance. The vein here is exposed in a series of jagged bluffs and can be seen continuing towards the summit. At an elevation of 5,900 feet the vein shows a width of about 9 feet along the face of a bluff, at which point A. B. Clabon, president of Vancouver Chamber of Mines, lost his life last year. Here several shallow diggings on the foot-wall side of the vein expose some nice showings of galena, a sample across 10 inches of which ran: Silver, 49.4 oz.; lead, 58 per cent.; zinc, 4 per cent. Whether these last showings are on the *Alice* claim of the *Woolsey* group or on the claim staked by O. Sandberg and Gus Hedstrom can best be ascertained by a survey.

Proceeding from the new tunnel down the hill, the East fork of Silver creek is crossed at an elevation of about 4,300 feet, and a good trail is followed to the showing on the east side of the creek, where at an elevation of 4,650 feet the vein has been uncovered from overburden and an open-cut exposes a width of 9.5 feet. The vein-filling of massive quartz is mineralized with galena in streaks and bunches, and with which is associated iron pyrites and zinc-blende. While small quantities of ore can be extracted, concentration would be necessary for profitable mining. Whether the average values obtainable at this point are sufficiently high for mill-feed at the present stage of development is questionable, and no definite opinion can be formed until the continuity and character of the deposit is proved by further work. A sample of the best grade of sorted ore from this cut ran: Silver, 49.4 oz.; lead, 46 per cent.; zinc, 6 per cent.

From the above brief description it will be seen that the vein is mineralized in a number of places over a wide area. The ore occurs in lenses and barren spots are bound to be more or less frequent. The future of the property depends on the development of a large tonnage and the ultimate erection of a concentrator. While the indications are favourable, careful judgment will have to be exercised as to where the work should be done to obtain the best results.

Iron Cap Group. This group, consisting of four claims and owned by A. Kitson and others, of Revelstoke, is situated on the summit of the divide between the headwaters of 15-Mile and LaForme creeks. Leaving the Big Bend road at 15-Mile creek, a slashed trail is followed for about four miles, from the end of which it is necessary to scramble through the brush until the open country of the summit is reached. In a total distance of about six miles an elevation of 5,200 feet has to be climbed. However, the grand scenery alone when near the summit is ample reward for the somewhat lengthy and arduous trip. A park-like country with grassy slopes and beautiful little lakes meets the eye when once out of the timber, and strikes very pleasing contrast with the bold and rugged peaks rising from and far above the ridge of the summit of the divide. The ridge, which is rounded on the westerly side, falls off abruptly to the east or towards LaForme creek.

The area, composed of granitic rocks cut by siliceous dykes, exhibits the various stages of transition from the highly siliceous rocks to the more basic variety. In a dark-green basic rock, probably an augite diorite, copper values have been found, the mineralization consisting of chalcopyrite and iron pyrites. On the surface the iron-stain due to oxidation is visible in a number of isolated places, but not sufficient work has been done at any one place to enable an opinion to be advanced on the possibilities.

Across a width of about 50 feet the face of a bluff on the east side of the summit shows the stain of iron oxide, which forms a thin film on the rock-surface, and under which the sulphides of iron are encountered, but there is little evidence of copper. At a short distance above this showing and on the summit of the ridge, at an elevation of 7,000 feet, several shallow diggings show the rock at a few feet below the surface to be disseminated with chalcopyrite. A sample of the best grade of ore from one of these cuts ran: Silver, 1 oz.; copper, 0.8 per cent. Samples of select ore have been obtained by the owners which ran as high as: Silver, 2.2 oz.; copper, 3 per cent.

A little more work done by the owners at the most favourable showings will demonstrate whether or not the property is worthy of more progressive development. At present it is a mere prospect with doubtful possibilities, but has been mentioned at some length in an endeavour to give at least a slight idea of this part of the country, about which little is known.

Scout Group. This property, consisting of a group of six claims, has been staked along the north-westerly spur of Goat mountain, and is principally owned by George Goldsmith, the original locator, and one of the pioneer prospectors of the district. A fairly good, though steep, trail leads from the valley of the Incomappleux river,

or what is generally known as Fish creek, to the property, which is situated at an elevation of 3,500 feet above the foot of the mountain. The trail, which is built up a narrow timbered ridge, gains this elevation by a great number of short switchbacks. The distance from Beaton to the trail turning is twelve miles by wagon-road and the trip can be comfortably made in a day.

The cabin, built on the face of the steep hillside, has a most pronounced list to starboard or down the hill, and has only been saved from its downward flight by means of many props and braces. However, when once inside, it offers good shelter and accommodation for three men. The hillside in the vicinity of and above the cabin presents a bare and steep rock-surface, consisting of a massive and compact formation of schists and alternating bands of limestone.

Running across the surface at an oblique angle there is a band of highly pyritized and silicified limestone, having a width of from 10 to 15 feet, conforming to the stratification of the enclosing rocks. The pyrite on the surface has been altered to a reddish variety of siderite. At the upper end of this mineralized band a tunnel has been driven for a distance of 185 feet along its strike. For the entire length of the tunnel the ground is soft, decomposed ledge-matter heavily stained with oxide of iron, in which occur at intervals streaks and small pockets of galena and some little carbonates and black sulphurets. A sample of the galena ran: Gold, 0.1 oz.; silver, 58.4 oz.; lead, 56.5 per cent.; zinc, 2 per cent. A sample of black sulphurets ran: Gold, 0.18 oz.; silver, 45.2 oz.; lead, 35.1 per cent. zinc, 2 per cent.

Several open-cuts expose the vein at lower altitudes, but except for showing its persistency along the strike are of little importance, as not enough work has been done. The vein is said to be traceable down the hillside to an approximate elevation of 3,000 feet below the tunnel, where water coming from the supposed *Scout* lead forms a falls some 20 feet in height.

There is still another showing on the *Scout* group towards the south-easterly end of the property and within sight of the *Mammoth* mine. Here an open-cut along the strike of a small quartz vein in the limestone exposes a few pockets and stringers of galena, but no ore-body of commercial importance. An assay of the galena from this showing ran: Gold, 0.06 oz.; silver, 43.2 oz.; lead, 31.2 per cent.; zinc, 4 per cent.

At the present time, although the property has good possibilities, there is hardly enough ore developed or work done on the lead for an examining engineer to commit himself in making definite statements regarding the probabilities of a large tonnage being available, on which the future of the property depends. The conditions warrant further work being done by the advancement of the present tunnel, with short crosscuts at intervals from wall to wall. It is not of much satisfaction to the engineer to know that the vein can be traced to the bottom of the mountain, or, for that matter, across several divides, unless it is mineralized. Of course, in all veins the ore occurs in shoots, and one cannot expect to find mineral along the whole length of the vein. If this vein can be traced to the bottom of the hill, or if there is some other vein exposed at this point, then it would also be advisable to do further prospecting in an effort to find ore and at a lower altitude.

Both the *Scout* group and the adjoining claims of the *Big Showing* group were examined by a number of engineers during the season, and were reported on by Newton Emmens for the Minister of Mines in 1914. Upon request of the owners another examination was made by the writer; hence it has been necessary to repeat much of the information contained in the 1914 Report.

Big Showing Group.—This property, comprising five claims, is located to the east of the *Scout* and on the same spur of Goat mountain. It is owned by John Leask and associates, of Cranbrook. Leaving the *Scout* trail at a short distance below the cabin, a descent of about 600 feet is made around the northern end of the spur to the gulch, the source of a small mountain torrent called Goldsmith creek, and also forms an excellent channel for snowslides, which have scoured its precipitous sides clean, leaving along the easterly side a precipitous and bare rock-exposure many hundred feet in height. On the westerly side of the gulch the slope is rugged, and the strata, dipping at a steep angle to the north-east, form a series of small benches or shoulders which can be climbed without much difficulty. This formation, consisting of schists, slate, and limestone, has a strike of N. 30° W.

The vein outcrops on the west side of the creek and is somewhat similar in character to that of the *Scout*, except that the sulphides are exposed on the surface, due to the action of erosion at this point keeping pace with that of oxidation. It conforms to the stratification of the enclosing rocks and can be traced for many thousands of feet. The surface exposure at the

outcrop is rightly called a "big showing," the width of the mineralized ledge being about 50 feet, in which a considerable quantity of galena occurs in patches and disseminations in a quartz gangue. The intervening bands of barren material are stained in places with oxide of iron. At this point the line of the surface cuts the vein at an angle which is not normal to the dip; hence the true width is not represented and is about 20 feet.

Ore can be traced for some distance up the hill until the vein becomes covered. It is reported that ore has been found in a precipitous bluff near the summit. A sample of the galena from the surface ran: Gold, trace; silver, 1.6 oz.; lead, 25.3 per cent.; zinc, 1.5 per cent. A sample of the iron-stained ledge-matter ran: Gold, trace; silver, trace; lead, *nil;* zinc, 4 per cent.

At an elevation of about 5,000 feet and at a vertical distance of 300 feet below the surface showing a tunnel has been driven for 171 feet, the first 66 feet of which follows a course of S. 20° E., and the next 105 feet due south. In driving this tunnel they did not allow for the dip of the vein, and it is therefore in the foot-wall side. When this was recognized a crosscut was started at a point 126 feet from the portal and was driven in a direction of N. 80° E. for 42 feet; it was abandoned when within about 20 feet of the vein. For prospecting purposes this tunnel-site is well chosen, but for operating the property on a large scale a more favourable site might be obtainable at a lower altitude and in a more accessible place. Good water-power and timber are within easy reach of the property.

From the tunnel a climb of 3,000 feet was made to the summit of the ridge, where there is an excellent view of the peaks of Goat mountain, on the slopes of which can be seen the many tunnels of the *Mammoth* mine. There are said to be some good showings of carbonate ore on the claims of the *Big Showing* group, some 2,000 feet below the saddle of the divide on which the old *Mammoth* cabin stands, but time did not allow an examination.

The *Big Showing* might be considered a good prospect, with possibilities of a large tonnage of low-grade ore. The amount of work done neither condemns the property nor proves the existence of a large tonnage. Further work should be done at the tunnel and on the surface. In order to trace the vein and closely study the geological conditions a week might be spent on the ground to advantage, but even then a man might not be very much the wiser as to the economic value of the property. Ore is what is needed, and it generally takes some powder and hard work to prove its existence in quantity. Hence the owners would be well advised to either do more prospecting themselves, or endeavour to interest capital by offering sufficiently attractive terms with a view of having further work done. A season's work by a small crew of men would do a lot to show up the possibilities of the property.

TROUT LAKE MINING DIVISION.

There has been less actual mining activity in this Division than usual, although there has been keen outside interest taken in many of the leading properties, as evidenced by the number of inquiries and the numerous examinations made by visiting engineers, which it is hoped will result in renewed activity during the coming year, for it is certainly a district which has great possibilities.

Old Gold. This property is situated at a distance of about thirteen miles from Ferguson and a short distance over the summit, which forms the dividing line between the Trout Lake and Ainsworth Divisions. A small crew of men was working this year, but so far no record of any shipment being made has come to hand. The ore is high-grade silver-lead, and in spite of extremely adverse conditions a considerable tonnage has been packed out from this property.

Crescent.—Situated near the headwaters of 8-Mile creek on the northerly side of Trout lake. Prospecting and development work were continued this year under the management of M. Leahy.

Triune. This property is easily reached from Ferguson, it being situated at a short distance beyond the end of the wagon-road up the South fork of Lardeau creek. The elevation of the mine-workings range from 7,500 to about 8,000 feet. Some 1,000 feet above the small basin at the head of Triune creek the mine cabin can be seen perched on the precipitous face of a bare rocky ridge of Triune mountain. About 600 feet above the cabin a small glacier rests among the rugged peaks of the summit, at the edge of which ore was first discovered, and from these original workings a considerable tonnage carrying high silver and gold values was extracted.

The development-work principally consists of four adit-tunnels. The No. 4 tunnel is driven in a slate formation for over 600 feet, but no ore has so far been developed, although conditions at the face look promising. Access to the portal of No. 3 is gained by the aid of a rope. This latter tunnel is connected with the No. 2 by a raise, but unfortunately a cave-in prevented the examination of this level, and incidentally the use of the raise, by means of which the upper workings are reached. An effort was made to scale the bluff, but without the aid of a rope it was decided that "the game was not worth the candle," so the upper workings were not examined. (Refer, Robertson, W. F., Annual Report of Minister of Mines, 1903, page 122.)

The band of dark slates in which the *Triune* vein occurs rests conformably on a foot-wall of yellow-weathering greenish-grey schists. The strike of the formation is N. 70° W. and dip 75 degrees to the north-east. The ore is galena, with which is associated iron pyrites and zinc-blende. The gangue is quartz. The average values of the last eighteen cars shipped ran: Silver, 182 oz.; lead, 34 per cent.; gold, 0.5 oz.; zinc, 6 to 9 per cent.

During recent years the mine has been operated under the management of R. H. Battey for the Minnesota Gold and Silver Mining and Manufacturing Company. No work was done on the property this year. Recent improvements include the installation of a 2-bucket tramway system to convey the ore down the mountain to the basin immediately below the cabin. The future of the property depends largely on the development of ore at a depth, and the present conditions appear to fully warrant the advancement of the No. 4 tunnel, although before doing this it would be advisable to have a proper survey of the mine made.

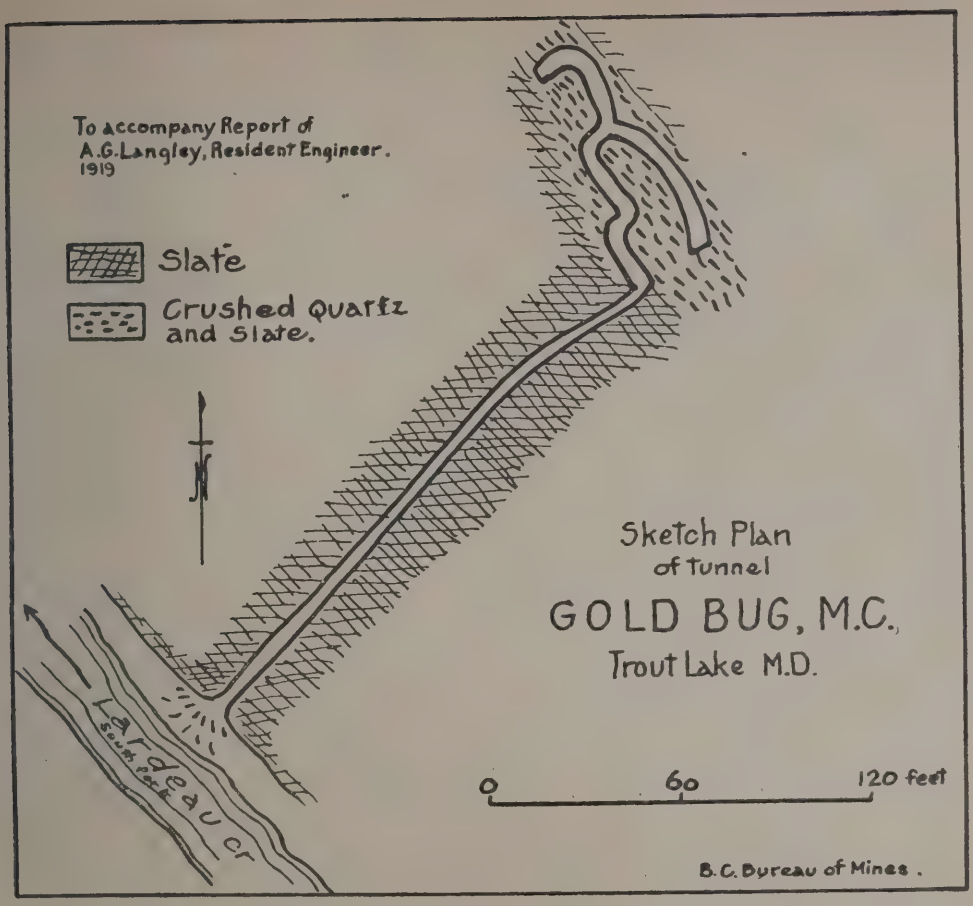
Gold Bug-Rambler Group.

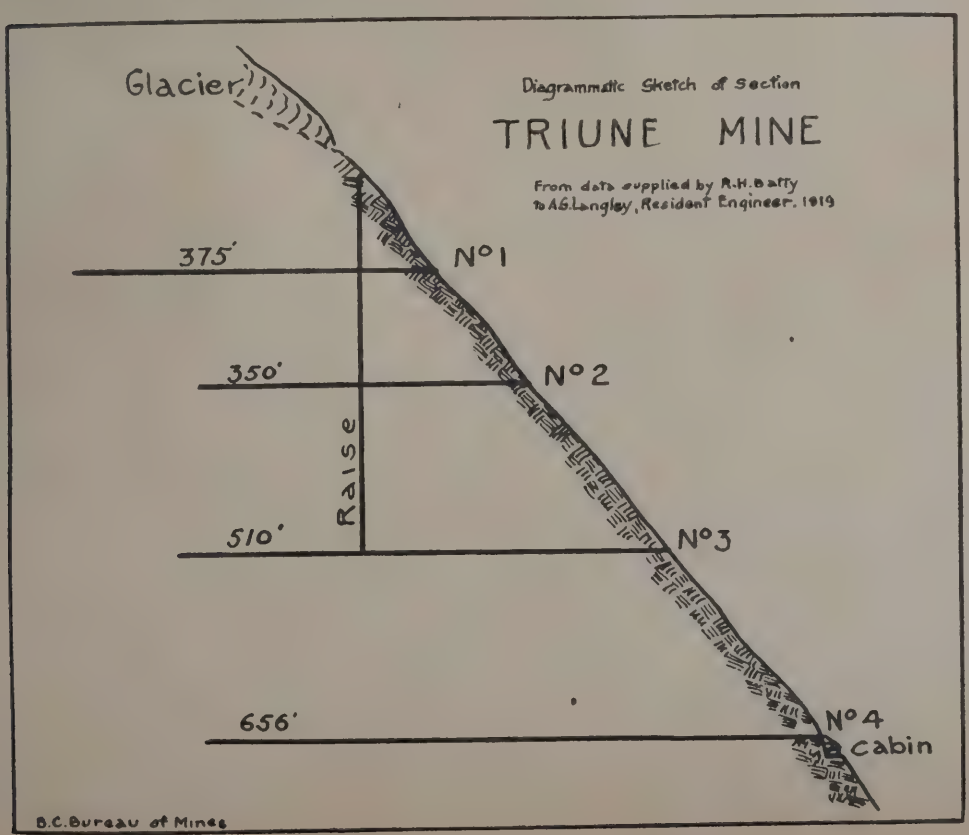
This group comprises four claims—*Gold Bug*, *Rambler*, *Silver Star*, and *Silver Spoon*. The property, which is owned by J. W. Livingstone, of Ferguson, is situated on the South fork of Lardeau creek, near the confluence of 7-Mile creek, and at a distance of seven miles from Trout lake. The location is ideal for mining operations, there being ample timber and water-power available, while there is an excellent wagon-road within a few hundred feet of the tunnel-site. The development-work, which was started many years ago, has been done single-handed by the owner.

On the surface of the *Gold Bug* claim there are few indications of mineral in-place, except along the northerly side of the creek, where some of the joint planes of the slate formation are filled with quartz carrying small quantities of galena. In the near-by *Silver Cup* property similar seams were found to invariably lead to ore, and as this group is located in the mineralized zone extending from the latter property to the *Nettie L.*, Livingstone decided to follow one of these seams with a crosscut tunnel. After driving through a massive slate formation for 190 feet a quartz vein was encountered, having an apparent strike of north-west. The quartz shows evidence of crushing and to be more or less mixed with crushed slate, and in places mineralized with galena, zinc-blende, and iron pyrites. Instead of crosscutting the main body of quartz at the place where it was first encountered, the drift meanders around the south side and finally ends at a point only a short distance from the face of the original crosscut. At this point, which is at the southerly end of the workings, the face of the drift shows a crushed massif of quartz and graphitic slates; on the southerly side there occur pockets of high-grade galena, a sample across 6 inches of which ran: Gold, 0.02 oz.; silver, 72 oz.; lead, 57.5 per cent.; zinc, 8 per cent. Another sample taken near the bottom of the drift across 12 inches ran: Gold, 0.02 oz.; silver, 12 oz.; lead, 6 per cent.; zinc, 36 per cent.

At the time of examination there was not any ore-body of commercial importance developed, but the general geological conditions appeared favourable for the deposition of ore, and the prospect might be considered one which has good possibilities.

At a distance of about 2,000 feet in an easterly direction a little surface work has been done on a showing of low-grade ore on the *Rambler* claim. Here a band of quartzite crosses the creek and is said to be a continuation of what is locally known as the *Nettie L.* dyke. There are several showings of quartz carrying small quantities of galena, zinc-blende, iron pyrites, and a little chalcopyrite, but there is no well-defined vein so far exposed, and the possibilities of this deposit are difficult to arrive at without further work being done, as the formation at this point does not appear to be in-place.


To accompany Report of
A.G. Langley, Resident Engineer.
1919
Slate
Crushed Quartz and Slate.
Sketch Plan
of Tunnel
GOLD BUG, M.C.,
Trout Lake M.D.
Lardeau cr
South Fork
0
60
120 feet
B.C. Bureau of Mines.


Glacier
Diagrammatic Sketch of Section
TRIUNE MINE
From data supplied by R.H. Baffy
to A.G. Langley, Resident Engineer. 1919
375'
No 1
350'
No 2
Raise
510'
No 3
656'
No 4
cabin
B.C. Bureau of Mines

NORTH-EAST KOOTENAY DISTRICT.

GOLDEN MINING DIVISION.

Report by John Bulman, Gold Commissioner.

I have the honour to submit herewith the annual report of the Golden Mining Division of the North-east Kootenay District.

Mining operations in this Division are at a standstill and nothing but the necessary assessment-work, in order to keep the recorded claims alive, has been done by way of development.

Monarch and Couverapee.—Situated on Mount Stephen, Field. These claims adjoin each other and in 1918 considerable shipments were made, but nothing has been done for the year 1919.

The *Giant* mine at Spillimacheen, a low-grade proposition with lots of ore in sight, has been idle all the year. Captain Armstrong, one of the owners, having been overseas, has now returned and we may expect operations to commence in the near future.

Office Statistics—Golden Mining Division.

Mineral claims recorded	40
Certificates of work issued	25
Free miners' certificates (ordinary)	125
Free miners' certificates (company)	1
Free miners' certificates (special)	3

Revenue.

Free miners' certificates	$ 979 50
General mining receipts	345 00
Tax on Crown-granted claims	972 50
Tax on mines and minerals	2,122 10
Total	$4,419 10

WINDERMERE MINING DIVISION.

Report by E. M. Sandilands, Mining Recorder.

I have the honour to submit my mining report for the year 1919 on operations in the Windermere Mining Division.

I am glad to be able to report that the amount of claims staked, certificates of work issued, and free miners' certificates sold exceed those of last year, and the general revenue of the office exceeded that of 1918 by some $1,500. Quite a little new interest has been taken in some of the old claims, and several deals are now pending which will mean the opening-up of several new groups in the spring. At time of writing the lack of snow is rather retarding the shipping of ore. During the coming summer quite a good deal of activity is expected, chiefly on account of the very high price of silver.

Paradise. This property has worked continuously during the year and is one of the oldest and steadiest shippers in the Province. It is owned by R. R. Bruce, of Invermere, and Robt. McDonald is the mine superintendent. It is situated on Spring creek, a tributary of Toby creek, and is distant about eighteen miles from Invermere, to which point the ore is hauled by wagons or sleighs for shipment. The average number of men worked at the mine is about twenty-five, besides the ore-haulers. About 2,000 tons of ore has been shipped during 1919. The ore is a sand-carbonate with some galena. The new "Cut-off" road on the south side of Toby creek has been improved this summer and a new phone system to the mine installed.

Nip and Tuck and Silver Tip.

This property is situated on McDonald creek and was formerly owned by W. Haupt. It has been sold to W. D. McMillan, of Seattle, Wash., and work was carried on during the summer. Some new rich surface showings were uncovered and about a car of high-grade ore sacked. The ore has not been shipped to date owing to the distance and, at that time, bad state of the road. Further development will be carried on in the spring.

Ptarmigan Mines.

This property is situated above McDonald creek and adjoins the *Nip and Tuck* group. It consists of a group of Crown-granted claims known as the *Red Line* group, and upon which a large amount of work was done and money expended in the early days by New York capital. The property is now under bond to E. W. Watson. Considerable prospecting on the surface was done during the summer and some new rich surface showings discovered; these were laid open by the receding of the glacier, which is claimed to have receded some 1,000 feet. Some 50 tons of rich ore has been sacked from the above-mentioned showings. At time of writing some 150 tons of dump-ore has been shipped to the smelter which was mined in the early days. This ore is now made profitable by the high price of silver; it goes about 40 oz. in silver and about $15 in gold; there is no lead in it. Possibly 1,000 tons of this ore will be shipped this winter which was intended for mill-feed by the old owners. The rich ore will be taken out later. Development on an extensive scale is looked for in the summer and possibly a mill installed.

Delos and Sitting Bull.

These properties are situated on Boulder creek, a tributary of Horse Thief creek, and have been worked continuously by W. W. Wonn, of Seattle, Wash., and associates. At the time of writing the property is closed down. What future developments are ahead I have no information. The wagon-road branching off Horse Thief road has been further improved and widened.

Lead Queen.

This property was formerly owned by Thos. Brown and partners and has since been sold to P. Denhart, Morris Thompson, and others, of Seattle, Wash. Considerable work was done on the property during the past year and about 80 tons of galena ore shipped. During the summer a crosscut tunnel was run to crosscut the vein some 250 feet; work was slow and expensive on account of the bad ground. About 90 feet more has to be driven. At time of writing the property is temporarily shut down, as it does not pay to operate again until spring on account of the expense of keeping the trail open, there being no ore ready yet for shipment. When the crosscut is finished it will cut down the hauling distance and in many ways make operating easier. P. Denhart, who is in charge of the property, intends to open up again in the spring and resume shipments. The property is on Frances creek and ships to Brisco, on the Kootenay Central Railway.

Isaac.

This property is on Frances creek and about three miles from the *Lead Queen*. It was formerly owned by H. E. Forster, who has now bonded it to W. D. McMillan and associates. About 80 tons of ore is now being shipped to Brisco and a small crew working under the management of P. Denhart. Work on a more extensive scale will be carried on next summer. There is a good showing of fairly good-grade galena ore.

Silver King Group.

This group of claims is situated on Jumbo creek, a tributary of Toby creek, and is owned by J. E. Stoddart and others. During the summer considerable work was done and a surface crosscut was run which uncovered a width of 85 feet of good milling-ore. The property is now under option and extensive work will be done in the spring. In all probability a mill will be built.

Bald Eagle Group.

This property is near the *Paradise* mine, but on the Boulder creek slope of the mountain. J. Burman and others own the group and two men have worked continuously. A crosscut tunnel has been driven some 200 feet. Some rich ore is exposed on the surface. The ledge is expected to be tapped very shortly now.

OFFICE STATISTICS—WINDERMERE MINING DIVISION.

Certificates of work recorded	89
Bills of sale, agreements, etc.	21
Claims recorded (quartz)	67
Claims recorded (placer)	1
Free miners' certificates sold (ordinary)	98
Free miners' certificates sold (special)	1

Revenue.

Free miners' certificates	$ 508 75
Mining receipts	701 95
Trade licences	222 50
Motor revenue	272 00
Gun licences	885 00
Water revenue	68 20
Poll-tax	110 00
Marriage	5 00
Law-stamps	2 45
General receipts	676 10
Total	$3,451 95

SOUTH-EAST KOOTENAY DISTRICT.

FORT STEELE MINING DIVISION.

REPORT BY N. A. WALLINGER, GOLD COMMISSIONER.

I have the honour to submit a report on the progress of mining in the Fort Steele Mining Division for the year 1919.

It can hardly be said that the mining season of 1919 has fulfilled all the prospects of 1918, as many of the proposed examinations did not take place, due to the unsettled conditions of labour and finance and high cost of everything connected with mining, and in one or two instances the want of transportation; and, finally, the unfortunate position in which gold is, the demand outstripping the supply, and the supply killed by the inability of the metal to take its place amongst the other metals in the race for high prices. This practically prohibits the exploration of low-grade free-milling gold quartz.

The placer operations have not turned out as well as expected on Wildhorse creek; the work of the Wild Horse Placer Mining Company was completely upset by the sudden spring floods causing the partial wreck of the boom-gate, and the subsequent work by the drag-line bucket system cannot demonstrate its value until sufficient depth is attained. The Gamble Placer Mining Company on Wildhorse did fairly well, the results paying a considerable sum after all expenses were deducted. Other placer operations on Weaver creek and Moyie river are still progressing and a great deal of work has been done; the prospecting being stated as very favourable. On Perry creek, where an ambitious scheme of hydraulicking is being followed, no actual washing took place, but considerable work was done in completing the flume and reinforcing and making vents in the big siphon. It is expected that the water will be turned on early in spring.

The result of quartz-mining has been more satisfactory, although actual ore shipments are not as big as they should be on account of the miners' strike, which is still in force.

The shipments from the *Sullivan* and *St. Eugene* mines, the properties of the Consolidated Mining and Smelting Company of Canada, Limited, are as follows:—

From the *Sullivan* mine: 14,890 tons of lead ore, yielding 126,446 oz. of silver and 8,453,344 lb. of lead; 117,007 tons of zinc ore, yielding 45,633,008 lb. of zinc and 3,060 tons of iron pyrites. The development-work has been kept up and improvements at the mine consist of a new modern dry-house, fully equipped with shower-baths, lavatories, etc., at the lower workings and new ore-bins and first-aid station at the upper workings.

From the *St. Eugene* mine: 776 tons of lead ore, yielding 13,383 oz. of silver; 565,004 lb. of lead; 2,179 tons of zinc ore, returning 827,695 lb. of zinc. All the above ore was sent to Trail.

The *North Star* shipped 7,121 tons, mostly lead carbonates taken from the mine chiefly, the dump supplying a small part; this amount would probably be much larger but for the fact of the disastrous forest fire in July, which burnt out a part of the tram-line and sixteen buildings, and subsequently a miners' strike that tied up the work for a while. Development has been carried on and fair supply of ore exposed.

The *Victor* group has sprung into life again, a bonding lease having been given; new development-work has already been started and a small concentrator is being installed, so that shipping and development may go together.

The *Guindon* group at Moyie broke into the shipping column with a small consignment of 5 tons of solid galena, from which a handsome return was obtained.

Great satisfaction has been felt over the bonding of the *Evans* group of claims on Whitefish creek to a Calgary syndicate, which is evidently making preparations for extensive development. This group contains a very large body of low-grade copper ore and its exploration will be followed with great interest; the problem of concentration is made somewhat easier by the vicinity of the waterfalls at the foot of the mountain. It is hoped that this will lead to more interest being taken in the St. Mary district, where so many excellent outcrops of copper are reported.

The hæmatite-deposits on Bull river and Sand creek have been examined and good reports issued, and as iron is in demand it is hoped that development may follow.

The discovery of a large iron-capped ledge carrying native copper has caused some stir; it is only a quarter of a mile from the railway crossing at Skookumchuck; the property was bonded at once and development is being pushed actively.

The reorganization of the company holding the *Park* group on Luke creek is welcome news, and the fact that a considerable sum has been set aside to sink the main shaft much deeper will cause the results to be watched with interest, as confidence in this locality needs reinforcing.

The low-grade free-milling gold quartz on Perry creek came in for examination, and as the work done during the year has been successful it is confidently expected that permanent development will be undertaken and a mill installed; its success would have far-reaching results, as the extent of this class of ore is very large. The outlook for a bonus on gold is causing a stronger interest in this class of ore.

The mining outlook for 1920 is bright, and would be brighter if the mineral resources of this district were more generally known; this, of course, will come as properties are opened up and demonstrated as being commercially profitable.

Office Statistics—Fort Steele Mining Division.

Mineral claims recorded (Form B)	108
Certificates of work (Form E)	157
Conveyances and other documents of title	65
Partnership agreements	1
Gold Commissioner's permits	16
Documents filed	36
Affidavits filed	210
Mining leases issued	16
Free miners' certificates (ordinary)	267
Free miners' certificates (company)	6

Revenue.

Free miners' certificates	$1,565 25
Mining receipts	3,090 85

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NORTH-WEST KOOTENAY DISTRICT.

REVELSTOKE AND LARDEAU MINING DIVISIONS.

REPORT BY ARTHUR JOHNSTON, GOLD COMMISSIONER.

I have the honour to submit herewith a report on the mining conditions within the Revelstoke and Lardeau Mining Divisions for the year ending December 31st, 1919.

REVELSTOKE MINING DIVISION.

BIG BEND DISTRICT.

There is nothing of importance to report in regard to lode-mining during the year. It is reported, however, on good authority that late in the fall a bond was taken on the copper properties formerly owned by the Prince Mining and Development Company, who operated extensively in Standard basin, forty miles north of Revelstoke, some twenty years ago. Many eminent mining engineers have reported favourably on this property, but the high cost of transportation is a serious drawback to the successful financial operation of same. If this bond is exercised during the coming season it will no doubt attract a great deal of attention to the mining possibilities of this district.

There is very little to report with regard to placer-mining activities during the year. Mr. Remillard and associates, who for the past two seasons have been constructing a flume from the headwaters of French creek to their properties lying in an old channel of this creek, completed same in the fall, and it is expected that active mining operations will be commenced this year. This property lies seventy-five miles to the north of Revelstoke. On 11-Mile and Keystone creeks Peterson Bros. are operating leases. The extent of their operations last year was chiefly in prospecting the ground, and the results of same were found to be most satisfactory. It is expected that work on this property will be prosecuted this year.

ALBERT CANYON AND ILLICILLEWAET DISTRICTS.

The *Woolsey* group was bonded to a company represented by C. V. Brennan, of Victoria, and the work already carried out on this property gives hopeful prospects that same will eventually be a large producer. This property is situated on Silver creek, about seven miles from Albert Canyon, and there is a good trail.

The *Lanark* mine, situated at Laurie, on the main line of the Canadian Pacific Railway, underwent development-work during the season, and it is expected that extensive mining operations will be in force this year.

The *Waverley-Tangier* property, situated twenty-five miles north-west of the main line of the Canadian Pacific Railway Company at Albert Canyon, was bonded to G. H. Walters, of the Walters Investment Company, of Spokane, Wash., two years ago, but has now been transferred to a company of wealthy capitalists of the State of Washington. During the season four men were actively engaged on this property in opening up the old workings and general exploration-work. The company proposes to put a large crew of men at work at the beginning of the season and to equip the property with the latest mining machinery, so as to ensure its success as a shipping concern. Some twenty-two years ago a wagon-road was built from Albert Canyon to these mines, but owing to disuse this road is in bad repair at the present moment. It is the intention of the company to open up this road, so as to facilitate the transportation of supplies and the shipment of ores.

No other mining activity worthy of mention occurred in the other parts of these districts.

OFFICE STATISTICS—REVELSTOKE MINING DIVISION.

(John Lee, Mining Recorder.)

Free miners' certificates	151
Free miners' certificates (company)	2
Certificates of work	64

Mineral claims recorded	63
Bills of sale recorded	11
Powers of attorney	2
Transfers	2
Memorandums of agreement	1
Payments in lieu of work	2
Groupings recorded	11
Placer leases recorded	5

LARDEAU MINING DIVISION.

There was a good deal of mining activity in the Camborne district of this Division. The *Beatrice* mines have been lying idle for about fifteen years, but were again opened up and the mine-workings put in shape for further development. This property is now owned by the New Era Mines, Limited, under bond from the original owners. It is reported that some fine lenses of ore have been exposed in the workings this fall and winter, which has proved most encouraging, not only to the new owners, but to the mining men of the district.

The *Multiplex* mines, of which O. T. Bibb is the present general manager, were idle during the season. It is understood that sufficient capital is now available for the continuation of development-work of this well-known property, upon which in 1917 and 1918 upwards of $25,000 was expended.

The *Berniere* group, owned by Cory Menhenick, was bonded last summer to J. A. Darragh, representing Indiana capitalists. Nearly the entire purchase price, as covered by the bond, has been paid by this company. It is the intention of the new company as soon as snow disappears to commence development operations on a large scale, and it is intimated that a stamp-mill will probably be erected during this summer.

It is likely that the *Eva* and *Oyster-Criterion* groups will be in operation this year after standing idle for many years.

The outlook for this year in regard to this camp is most encouraging, and, generally speaking, a very optimistic spirit is prevalent among the mining men of these Divisions.

Office Statistics—Lardeau Mining Division.

(Mrs. F. I. Fraser, Mining Recorder.)

Free miners' certificates	32
Free miners' certificates (company)	1
Locations recorded	15
Certificates of work recorded	70
Bills of sale recorded	8
Transfers recorded	1
Payments in lieu of work	2
Groupings recorded	20

SLOCAN DISTRICT.

AINSWORTH MINING DIVISION.

REPORT BY R. J. STENSON, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on mining developments in the Ainsworth Mining Division for the year ending December 31st, 1919.

I regret to say the tonnage shipped during the year was less than half of that for the previous year, due, partially, to the shortage of water-supply for power purposes.

There was considerable activity on the South fork of Kaslo creek. The bond on the *Index* was taken up and James Carter, of Kaslo, sold the *Flint* and *Bulis* claims to E. J. Edwards and associates on October 16th for $22,000 cash.

The *Flint* worked continuously during the year and 20 tons of high-grade ore was taken out before the property was sold.

The *Marten*, owned by Power & Carter, was developed by 32 feet of upraise and 50 feet of drifts on the lead; ore averaging 10 inches was uncovered, assaying 84 oz. silver and 62 per cent. lead.

The *Manganese*, situated on Kaslo creek, shipped two cars of manganese ore to Trail.

Kirby Group. The *Kirby* group of four claims, situated about half a mile north-east of the *Bluebell* and a quarter of a mile from Kootenay lake, was located by A. J. Curle, of Kaslo, in the spring of 1919. Four inches of clean galena and 18 inches of zinc ore outcropped on the surface; the ledge consists of schist and lime. Development-work was commenced in October, crosscutting the ledge 50 feet, with more or less mineralization of iron sulphide, zinc, and galena for the entire distance.

Tunnel No. 1 was drifted on the vein for a distance of 40 feet, the pay-streak widening from 3 to 15 inches, consisting of clean galena and zinc; beautiful ruby-silver occurs in the clean galena and assays have been obtained running from 63 to 1,978 oz. silver and 64 to 80 per cent. lead.

Tunnel No. 2 was driven about 8 feet, crosscutting the vein from the hanging-wall; the first shot uncovered 3 inches of clean galena which widened out to 6 inches zinc and spathic iron; the galena assaying 250 oz. silver and 64 per cent. lead, the zinc ore carrying from 15 to 29 per cent. zinc and 15 oz. silver.

This is an interesting discovery, as showing the possibilities to be obtained from prospecting old camps.

Silver Bear. Situated on South fork of Kaslo creek. This property is under bond to F. Helme, Kaslo, on which two payments have been made. The ledge is 55 feet wide, composed of lime, talc, and calcite, with an average of 18 inches of carbonate ore assaying 168 oz. silver and 9 inches of lead ore running 187 oz. silver and 70 per cent. lead. The development-work was one crosscut 70 feet long with a drift on the vein of 65 feet, and one 165 feet long with drift on the vein of 55 feet, and 40 feet of open-cut. A bunk-house, 18 x 23 feet, was erected and 23 tons of ore shipped.

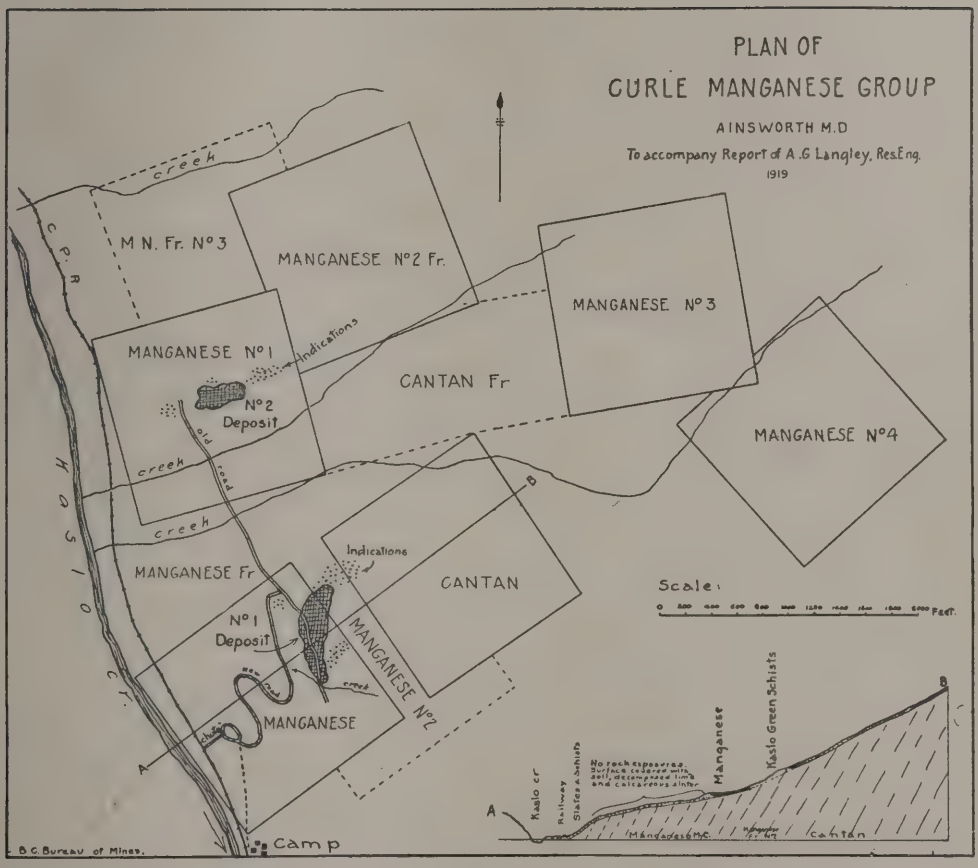
Work on the *Helen group* and *Boulder*, situated in Stanley basin and owned by English Bros., of Kaslo, consisted of 100 feet of raise, 80 feet of drifting, and 40 feet of open-cuts, making a total of 1,200 feet of tunnel and 300 feet of upraise.

Work on the *Boulder* consisted of 30 feet of open-cuts and 10 feet of shaft, in which they have from 2 to 14 inches of lead ore.

The *Spokane*, in Ainsworth camp, under the management of J. McDougal, employed six men throughout the year; 400 feet of drifts and raises were accomplished and over 400 tons of ore shipped.

The *Ruth*, under lease to E. D. Smith and associates, worked for four months, shipping 500 tons of mill tailings.

The *Maestro*, under lease to T. Hawes and G. McPherson, worked for six months and shipped 60 tons of ore. The work consisted of 150 feet of drifts.


PLAN OF
CURLE MANGANESE GROUP
AINSWORTH M.D
To accompany Report of A.G Langley, Res.Eng.
1919
M N. Fr. N°3
MANGANESE N°2 Fr.
MANGANESE N°3
MANGANESE N°1
Indications
CANTAN Fr
N°2 Deposit
MANGANESE N°4
old road
creek
creek
creek
Indications
MANGANESE Fr
CANTAN
N°1 Deposit
MANGANESE N°2
MANGANESE
Camp
C.P.R
KASLO R.
A
B
Scale:
Feet.
Kaslo cr
Railway
Slates & Schists
No rock exposures. Surface covered with soil, decomposed lime and calcareous sinter
Manganese
Kaslo Green Schists
Mandarosite
Cantan
B.C. Bureau of Mines.

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The *Eden-Crescent*, worked by three men, improved the ore-showing considerably; about 100 feet of development-work was done.

On the *Grant* two men were employed for part of the year crosscutting and raising some 50 feet; some fine ore was encountered and 1 ton for sampling purposes.

The *Tariff*, under lease to F. Kennedy and A. Bridge, worked for nine months and shipped 48 tons of ore, drifting and crosscutting 90 feet during operation.

The *Skyline* was operated under lease by O. Nelson and two men; work on drifts and raises to the extent of 130 feet was done and 130 tons of ore shipped.

The *Little Phil* was worked the greater part of the year by E. Peterson and W. Trainor under lease, sinking shaft 30 feet, 80 feet of drift, and 20 feet of crosscut, and shipped 20 tons of ore.

Work on the *United* consisted of 70 feet of drifting, which was carried on by two men for about six months; 29 tons of ore was shipped.

Gallagher.—Six tons of ore was shipped by H. McVicar.

Bluebell. Situated at Riondel. The work of the year was directed to further development of the upper levels; unwatering the lower levels, which had been submerged since March, 1918; reconstruction of the rock-house; and alterations of headworks to permit improvement of the quality of oxidized ore, of which important but indefinite tonnage remains. Although the mine had been unwatered at the end of the year, excepting the lowest level, and resumption of operation at depth was expected during January, this has been prevented by the extreme shortage of water-power. Conditions affecting water-supply seem to preclude resumption before early spring of 1920.

During the year there was shipped from the mine 1,192 tons of oxidized ore and 35 tons of concentrate. The average number of persons employed during the year was nineteen.

Silver Bell.—Situated on the South fork of Kaslo creek and owned by Green Bros., of Kaslo. Development-work consisted of 210 feet of drifting, 360 feet of crosscutting, and 157 feet of raise. A new camp was built to accommodate twenty men. Ore shipped for the year, 93 tons.

The *Utica* was worked for about three months, employing an average of twelve men, and shipped 155 tons of ore, which produced 17,360 oz. silver and 26 tons of lead. The work consisted of raises and drift.

On the *No. 1* mine, operated by the Consolidated Mining and Smelting Company, development consisted of 398 feet of drifting and crosscutting, together with 1,274 feet of diamond-drilling; 169 tons of ore shipped; nine men were employed.

The *Highland*, operated by the above company, employed an average of thirty-three men and shipped 127 tons of crude ore and 308 tons of concentrates. Development consisted of 998 feet of drifting, crosscutting, and raising, together with 3,276 feet of diamond-drilling.

The *Cork-Province* mines, under the management of W. E. Zwicky, operated from May to September 30th, one shift, when water for power purposes gave out. Produced 200 tons of silver-lead concentrates and some zinc concentrates, one car of which was shipped. Management is making arrangements to install a generator, which should provide sufficient power to run mine and mill by electric power the year round.

Washington.—Located above the *Rambler* mine at Rambler. Under the management of W. H. Burgess. A lease of the *Carbonate King* was given to Monaghan & McKiernan, who worked the ground until snowfall. An examination was made of the *Washington* by R. H. Stewart, M.E., for the owners.

Deep.—Located at Retallack. Under the management of W. H. Burgess. A fire destroyed the cook-house, dining and dry rooms during the early spring. Some men were employed cleaning up for the mine, and an examination was made by R. H. Stewart, M.E., for the owners. It is understood that some more development-work may be undertaken next year.

Whitewater.—Located at Retallack. Under the management of W. H. Burgess. Worked in the main by leasers, of which there were thirty on the job at the end of the year. Some very good results were obtained; 619 tons of silver-lead ore and 202 tons of silver-zinc ore was shipped, partly to Trail and partly to Midvale, Utah. The company has lately undertaken some development-work and the results to date are said to be encouraging.

The *Ten Day Man*, owned by R. Hughes and J. Chisholm, worked part of the year and shipped 16 tons of ore, valued at $4,000.

The *Beaver* was worked for about three months by the owners, J. McDonald, J. M. Allen, and A. Jardine, extending the tunnel 35 feet, with encouraging improvement of the ore-showing.

OFFICE STATISTICS—AINSWORTH MINING DIVISION.

Free miners' certificates	186
Mineral claims recorded	31
Assessments	185
Transfers	42
Mineral claim leases	11
Certificates of improvements	2

SLOCAN MINING DIVISION.

REPORT BY ANGUS MCINNES, MINING RECORDER.

I have the honour to submit herewith the annual report on the mining operations in the Slocan Mining Division for the year ending December 31st, 1919.

The year just closed has been a very prosperous one for the mine-owners of this district. Sandon for the present is the busy camp of the district, there being eleven properties operating in that vicinity—namely, *Ivanhoe*, *Reco*, *Silversmith*, *Hope and Ruth*, *Noble Five*, *Wonderful*, *Surprise*, *Richmond-Eureka*, *Sovereign*, *Minnehaha*, and *Mercury* groups.

The *Silversmith*, formerly the *Slocan Star*, has more ore in sight and blocked out than at any time in its history.

The *Noble Five* management has a fine new concentrator about ready to start operations. It is the second largest plant in the Province of that kind, the Cunningham mill at Alamo being the first.

The *Ivanhoe* and *Surprise* groups are owned and operated by the Rosebery-Surprise Mining Company, with headquarters at Chicago. There are two concentrating plants, one at Sandon and one at Rosebery. P. J. McFadden is manager.

The *Wonderful* and *Sovereign* are operated by Clarence Cunningham. The ore from these properties is taken by railroad to Alamo, where it is concentrated and shipped from there.

The *Minnehaha* is owned and operated by Alexander Mann, railroad contractor, of Vancouver. George Clark is in charge.

The *Mercury* has recently been bonded to Seattle people, who have a small gang doing development-work.

At the Alamo camp the following properties are working: *Idaho-Alamo*, *Queen Bess*, *Rambler*, *Soho*, *McAllister*, and *Granville* groups. The *Idaho-Alamo* and *Queen Bess* groups are owned and operated by Clarence Cunningham. The ores from all his properties are treated at his plant at Alamo.

At the New Denver camp the following properties are working: *Bosun*, *Mollie Hughes*, *Mowitch*, *Marion*, and *Capella* groups.

The *Bosun* group is owned and operated by the Rosebery-Surprise Mining Company. The ore from this property is taken by water to Rosebery, where it is treated at the company's mill. Fred. J. Murphy is the mining engineer in charge, assisted by Stanley Moore at the mine. The other properties in this camp mostly worked under lease to miners who are making them pay well.

At the Silverton camp the following properties are working: *Standard* and *Van-Roi* groups. The *Standard* has worked constantly for fourteen years and paid several million dollars in dividends. The *Van-Roi* is working a small crew at present doing development-work.

In the early part of the year labour was hard to get and work on most of the mines was somewhat curtailed.

Mr. Langley, the Government Mining Engineer, has been a great help to many prospectors as well as to mine-owners during the year.

OFFICE STATISTICS—SLOCAN MINING DIVISION.

Free miners' certificates issued	214
Mineral claims recorded	41
Assessments recorded	154
Transfers and other documents	10
Revenue collected	$5,374 09

SLOCAN CITY MINING DIVISION.

Report by T. McNeish, Mining Recorder.

I have the honour to submit my report for the Slocan City Mining Division for the year ending December 31st, 1919.

In so far as mining development on any large scale is concerned, the situation is practically unchanged from last year. There has been considerable work done on some of the properties, which has given very encouraging results, and I beg to submit herewith a memorandum of such work done.

The *Black Prince*, which is under lease to J. T. Tipping, shipped 32 tons of very high-grade ore which was taken out in development-work.

The *Meteor* group, owned by J. C. Buchanan, has done considerable development and is at present driving a long crosscut tunnel to tap the lead at depth. During the year 92 tons of high-grade silver ore was shipped.

The *Eastmont*, which was under lease to H. D. Lea and associates, shipped 102 tons of ore. It is believed that with extensive development this property could be made a heavy shipper.

The *Anna* group is under lease and bond to Earl Hyde and is doing extensive development-work; a good streak of very rich ore has been struck.

The *Arlington*, which was under lease to M. S. Davys, shipped 509 tons of dump.

The *Republic*, which is under lease to J. W. Evans and J. N. Nelson, is doing extensive development-work and has shipped 23 tons taken out in such work, and another car is ready for shipment.

The *Ottawa* group, which is under lease to A. L. McPhee, shipped 377 tons of ore, and according to reports the property is looking better than ever before.

The *Little Tim*, owned by D. B. O'Neail and A. S. McAuley, has been doing development-work, and 5 tons of ore is ready for shipment.

The *Evening Star*, owned by Hugh Sutherland, of Winnipeg, Man., has had a crew erecting buildings, ore-sheds, etc., to replace those burnt last year, and is now driving a long crosscut to cut the vein at depth. Big things are looked for from this mine if the ore-body continues at depth.

The *Neepawa* group on Enterprise creek has done considerable development-work and is going to build a plant in the spring to treat the low-grade ore, and it looks as if in the near future this property will be a big shipper.

Office Statistics—Slocan City Mining Division.

Free miners' certificates issued	67
Certificates of work issued	75
Locations recorded	55
Transfers recorded	8
Notices to group	15
Poll-tax receipts issued	28
Firearms licences issued	38
Marriage licences issued	2
Total revenue collected	$1,041 00

TROUT LAKE MINING DIVISION.

Report by Oscar Jacobson, Mining Recorder.

I have the honour to submit herewith my report of the progress of the mining industry in the Trout Lake Division for the year 1919.

During the season of 1919 the mining industry did not do as well as was expected at the beginning, as no property was turned over to any company for development; but still the yearly assessment-work on all of the promising claims was kept up, showing that the owners still have faith in their properties. The new locations of claims during the year were well up to the number of last year's.

OFFICE STATISTICS—TROUT LAKE MINING DIVISION.

Free miners' certificates issued (ordinary)	52
Free miners' certificates issued (company)	1
Locations recorded	26
Certificates of work	127
Payment in lieu of work	1
Notices to group (filed)	28
Transfers recorded	4
Agreements recorded	2
Leases and options	1
Traders licences issued	13
Game licences issued	29
Poll-tax collected	6

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NELSON DISTRICT.

NELSON MINING DIVISION.

Report by J. Cartmel, Gold Commissioner.

I have the honour to submit the annual report on the Nelson Mining Division for the year ending December 31st, 1919.

Judging from the increased amount of development-work and general interest in the mining industry throughout this district during the past year and the promising showings on a number of the newer properties, the outlook for the immediate future is certainly more encouraging than for quite a few years past, and justifies the optimistic feeling displayed in mining circles.

Nelson Camp.

Silver King.—Two men were stationed at this property till the end of October, engaged entirely in unwatering the mine. No ore was mined or shipped and the only development done was diamond-drilling totalling 305 feet.

California. This property has been developed during the past two years and a half by J. R. Cassin and associates, of Spokane, Wash., who have it under bond. The *Athabasca* mill has been acquired and reconstructed ready to treat the ore from the *California* and also the *Exchequer* mine, which the same parties have acquired. Several tunnels have been run and ore blocked out at considerable depth. From six to ten men have been employed in development, and it is understood that a force of from forty to fifty will soon be at work. A test shipment of 93 tons of ore was sent to the Trail smelter. A wagon-road about a mile in length has been constructed from the California to the mill, over which the ore, which carries a good percentage of free gold, will be hauled by an auto-truck.

Eureka Group. This group, comprising seven claims, is under lease and bond to the Vincent Development Company, of Walla Walla, Wash., who has also acquired the well-known *Granite-Poorman* property. Flotation equipment is being installed in the mill at the latter mine to treat the *Eureka* ore, which carries copper-silver-gold values. A considerable amount of development has been done on the *Eureka* during the past year, with encouraging results, and at the present time a crosscut is being driven to develop the known ore-bodies at 200 feet greater depth. It is expected that this property will be one of the large producers of the district with completion of the mill this coming fall. Two hundred and forty-eight tons of ore was shipped to the Trail smelter during the season.

Perrier Group.—Very little development has been done on this property during the past year, outside of surface-sluicing, for which the necessary equipment is available.

The *Monarch* group, consisting of seven claims, situated near Hall Siding, has been steadily developed by Jas. Fisher and associates, and I am informed that a diamond-drill is being installed to explore the vein, which has a width of 50 feet and carries copper and silver.

Noonday Group. Situated at the head of 9-Mile or Sictum creek, which flows into the West arm of Kootenay lake on the north side, owned by Ratcliffe & Johnson, of Nelson, is under bond to a Spokane syndicate who are developing same and have erected a small Gibson mill on the property. It is stated that the ore from this property has given some splendid assays, one being over $1,400 in gold.

Jack Pot Group. This group of claims, situated on Eagle creek a few miles west of Nelson, has been acquired by Baskin & Stedman, of Nelson, who have had a small force of men employed opening up and extending old workings. A large vein carrying copper-silver-gold of probable mill value has been developed. A rather promising find of copper ore has been made on McPhail's ranch on this creek, and Mr. McPhail intends doing some development on same during the coming season.

Joseph Baxter, owner of *Ophir* and *Black Rock* claims on Bird creek, in the same vicinity, has done considerable development, resulting, I am informed, in finding some high-grade gold ore on the *Ophir* and copper-gold on the *Black Rock*.

The *Beasley-Monarch* group, situated near Beasley Siding, is under bond to the Fall Creek Mining Company. Carl M. Mohr is manager. Considerable development, chiefly surface work, has been done and some promising copper ore found.

The *Wonderful* group, in the vicinity of Hall Siding, is being developed by the Terzian Bros., who are driving a crosscut tunnel to strike the vein, which carries silver-lead, at depth. They are very hopeful of their expectations being realized.

The *Morning Star* group, also near Hall Siding, is being worked by the same parties and a good-looking vein of copper-gold ore has been struck, giving very encouraging assays.

The *Gold Plate* and *Gold Note* on Eagle creek, owned by Jeff Steele and Alex. Long, respectively, and the *Gold Hill* on 49-creek, owned by Alex. McDonald, have all been under development, with promising results, I believe.

Apex.—Jeff Swanson and partners have worked on this claim, which is situated in the vinicity of Apex Station, throughout the season, and have struck a vein of gold ore said to carry values.

Molly Gibson. This well-known mine, operated by the Consolidated Mining and Smelting Company, has been worked throughout the season, an average of thirty men having been employed, over $37,000 being spent in wages. Some 665 feet of drifting was done and 76 feet of raise driven; 2,442 tons of ore was mined, of which 561 was crude and 1,881 mill-feed; 816 tons of ore was milled, producing 100 tons of concentrates. No additions to the plant have been made.

YMIR CAMP.

Yankee Girl. The Hobson Silver Lead Company has not made any shipments from this mine owing to the relatively low price of gold coupled with the high cost of production, but steady development has been carried on, resulting in the encountering of a new vein which it is expected will be found to join with the parent vein at depth. It is rumoured that one of the large Canadian mining corporations is negotiating for the purchase of the *Yankee Girl*, *Dundee*, and other properties in this vicinity.

The *Commodore*, owned by Grobe & Pollan, has been developed throughout the season.

Porto Rico.—A few tons of ore was shipped from this mine to the Trail smelter.

ERIE CAMP.

Second Relief. The plant at this mine unfortunately was wiped out by forest fires last summer, and consequently operations were suspended for the time being. However, A. D. Westby, the manager, reports that financial arrangements are being made with a view to again placing the mine on a producing basis.

Fort Steele Group. This group, consisting of six claims, is situated on Granite creek, a tributary of the North fork of Salmon River, and is owned by August Armbruster and E. E. McArthur. The ore is complex, the chief values being in gold, and as the showing is promising the owners are sanguine that the property will make good when economic conditions become more nearly normal.

Grand Chance Group. This group consists of four claims on Keystone mountain, Whisky creek, near Erie. Joseph Barnard and W. H. Rhomberg are the owners. Seventy-five feet of drift was run during the season and the tunnel is now in 165 feet, exposing a small high-grade silver-gold showing in a 6-foot vein, which is steadily improving with development.

SHEEP CREEK CAMP.

Queen. This well-known property, together with the *Kootenay Belle* and *Vancouver* groups, are under bond to A. W. McCune, of Salt Lake City, Utah, who has a force of men engaged in driving a crosscut tunnel from the *Queen* to tap the known bodies on the *Vancouver*, but the work was discontinued at a point about 800 feet short of the objective after some 1,700 feet of the tunnel had been run, apparently expected values not having been encountered on the way. The formation through which the tunnel was run is schistose, and as the values thereabouts are carried in the quartzite it was doubtless not considered justifiable to continue further with this work.

Motherlode-Nugget. These properties have been amalgamated under the ownership of the Nugget Gold Mines, Limited, and last March work was commenced on a tunnel from the lowest workings of the *Motherlode* with the object of intersecting the main *Nugget* vein at 625 feet below the No. 4 level of the latter mine. The new tunnel has been driven a distance of 1,165 feet, the time consumed on the work having been lengthened out somewhat owing to various vexatious delays caused by shortage of water in the fall, encountering very hard rock, etc.; but at the time of writing I am pleased to learn that the objective has been gained, the vein having been crosscut, showing a width of 12 feet and exposing an ore-body. No further particulars are available as yet, but as this is in all probability the same ore-body as exposed in the upper workings of the *Nugget*, it doubtless means a new lease of life for the property, with consequent benefit to the district and all concerned. An average of fifteen men has been employed on the work. Harold Lakes is the manager.

Ore Hill and Summit. These properties, which are situated on the south side of Wolf creek, a tributary of Sheep creek, have been steadily developed during the season by W. B. Poole and associates, as also the *Reno-Donnybrook* group. The development consists mainly of surface work, and as the showings are exceptionally good, these promise to be good properties.

Emerald. This well-known lead-silver property is situated on the divide between Sheep and Lost creeks and is owned by the Iron Mountain, Limited. John Waldbeser is manager. Steady development has been carried on during the past year, and a test-mill has been erected which it is expected will be in operation this spring when water is available. One hundred and seventy-seven tons of ore was shipped to the smelter at Trail, and 42 from the *Jersey* in the same vicinity.

Southern Belle.—This is also a lead-silver property of promise, on which some development-work was done. Some dispute as to title apparently has held up more active operation.

Nevada Group.—Situated on Nevada mountain between Lost and Sheep creeks. An interesting showing in gold was disclosed last fall which justifies the belief that the property may become of importance with development.

The *Dodge* group consists of four claims on Little Sheep creek. Only surface development has been done to date, exposing a small, persistent lead-silver vein for several hundred feet. Mazrall & Rhomberg are the owners.

The *Bonanza* group on Wolf creek (Geo. Bell, of Salmo, owner), carrying principally values in gold, has been under development, and about 20 tons of ore from the surface workings was put through the *Ore Hill* mill.

Spokane Group. Laib Bros. have developed this property, which is situated in the Bayonne section, to the extent of 300 feet by three tunnels and have some ore blocked out with a view to shipping. A car-load was hauled out and shipped to the Trail smelter this fall, but owing to difficulties of transportation to the railway this was found to be too costly, although the shipment gave good returns. An arrastra has been constructed to test the ore locally with a view to making high-grade concentrate for shipping.

Iva Fern Group. This group, situated on Cultus creek, is under development bond to the Consolidated Mining and Smelting Company, Limited, and consists of fifteen claims, seven of which have been Crown-granted. A comprehensive plan of development has been initiated, but owing to the scarcity of miners the contemplated long crosscut tunnel, started to cut all veins, was only driven 225 feet, and work was closed down during the winter, the intention being to install machinery as soon as weather conditions permit in the spring. Several hundred feet of surface-trenching was done, disclosing a series of parallel veins of economic width and value, and from all indications the property promises to be a large producer. The values are in lead-silver-copper-gold. J. W. Mulholland, the locator and owner, has been retained as manager.

Dull Pick Group. This is an extension of the *Iva-Fern* and is owned by a Nelson syndicate. Only surface development was done during the past year, but a vein was disclosed which appears to be a continuation to the south of the mineralized zone opened on the *Iva-Fern*, and is said to carry good values in copper and silver.

Several promising strikes are reported to have been made at the head of Cultus creek last summer, but no details of same are to hand; and from the Bayonne section generally good

reports have come in, but owing to the lack of roads and the poor condition of the few trails the development of this promising region is necessarily retarded.

OTHER PROPERTIES.

La France Creek.—The La France Creek Mining Company's properties have had very little development done other than the usual assessment. Work was closed down last April, but I understand negotiations were under way during the summer with a view to raising the necessary capital to place the mine on a producing basis. There are several levels aggregating 1,100 feet of tunnel, and the ore, which is silver-lead-zinc, has been tapped at 600 feet depth. Difficulties of transportation from the mine to Kootenay lake constitute a great handicap. I am told that $60,000 has already been spent on the property.

Lockhart Creek.—Thos. Wall and Robert Yuill's properties on this creek are stated to have shown up a promising vein of silver-lead ore with a small amount of development-work.

The *Sullivan* group, in the vicinity of Kitchener, has been under development, consisting chiefly of surface work, with fairly promising results, a vein carrying copper-silver-gold being exposed.

PLACER.

Placer-mining has been dormant during the past season, only four claims having been recorded, from the owners of which no reports have been received.

OFFICE STATISTICS—NELSON MINING DIVISION.

Free miners' certificates (individual)	468
Free miners' certificates (company)	7
Free miners' certificates (special)	4
Claims recorded (mineral)	220
Claims recorded (placer)	4
Certificates of work recorded	426
Agreements, transfers, etc.	110

ARROW LAKE MINING DIVISION.

WALTER SCOTT, MINING RECORDER (OFFICE AT NAKUSP).

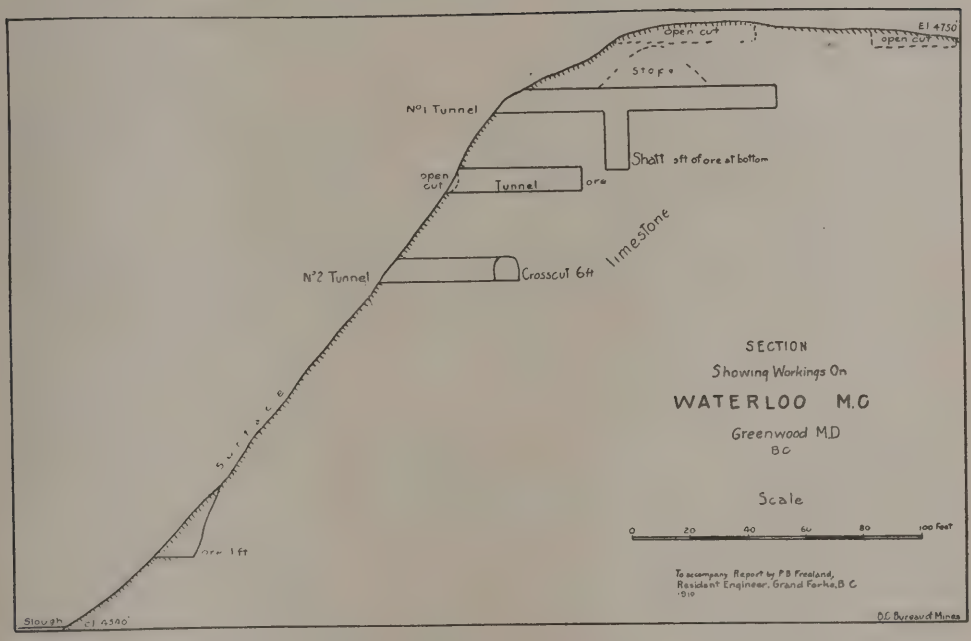
I have the honour to submit the annual report of the Arrow Lake Mining Division for the year ending December 31st, 1919.

Millie Mack.—This mine belongs to H. E. Forster, of Wilmer. A force of men has been working all summer and 25 tons of high-grade galena ore has been shipped to Trail smelter.

Tillicum Group.—This group is owned by J. G. Reveler and Lawrence Robson, of Burton, who have run a tunnel over 20 feet on the vein and have a good showing of galena and iron pyrites carrying gold. The vein-wall is in-place and looks good.

OFFICE STATISTICS—ARROW LAKE MINING DIVISION.

Free miners' certificates issued	55
Certificates of work recorded	14
Mineral claims recorded	21


El 4750'
open cut
open cut
STOPE
No1 Tunnel
Shaft 5ft of ore at bottom
open cut
Tunnel
ore
No2 Tunnel
Crosscut 6ft
limestone
SURFACE
ore 1ft
Slough
el 4300'
SECTION
Showing Workings On
WATERLOO M.C
Greenwood M.D
BC
Scale
0 20 40 60 80 100 feet
To accompany Report by P.B Freeland,
Resident Engineer, Grand Forks, B.C
1910
D.C. Bureau of Mines

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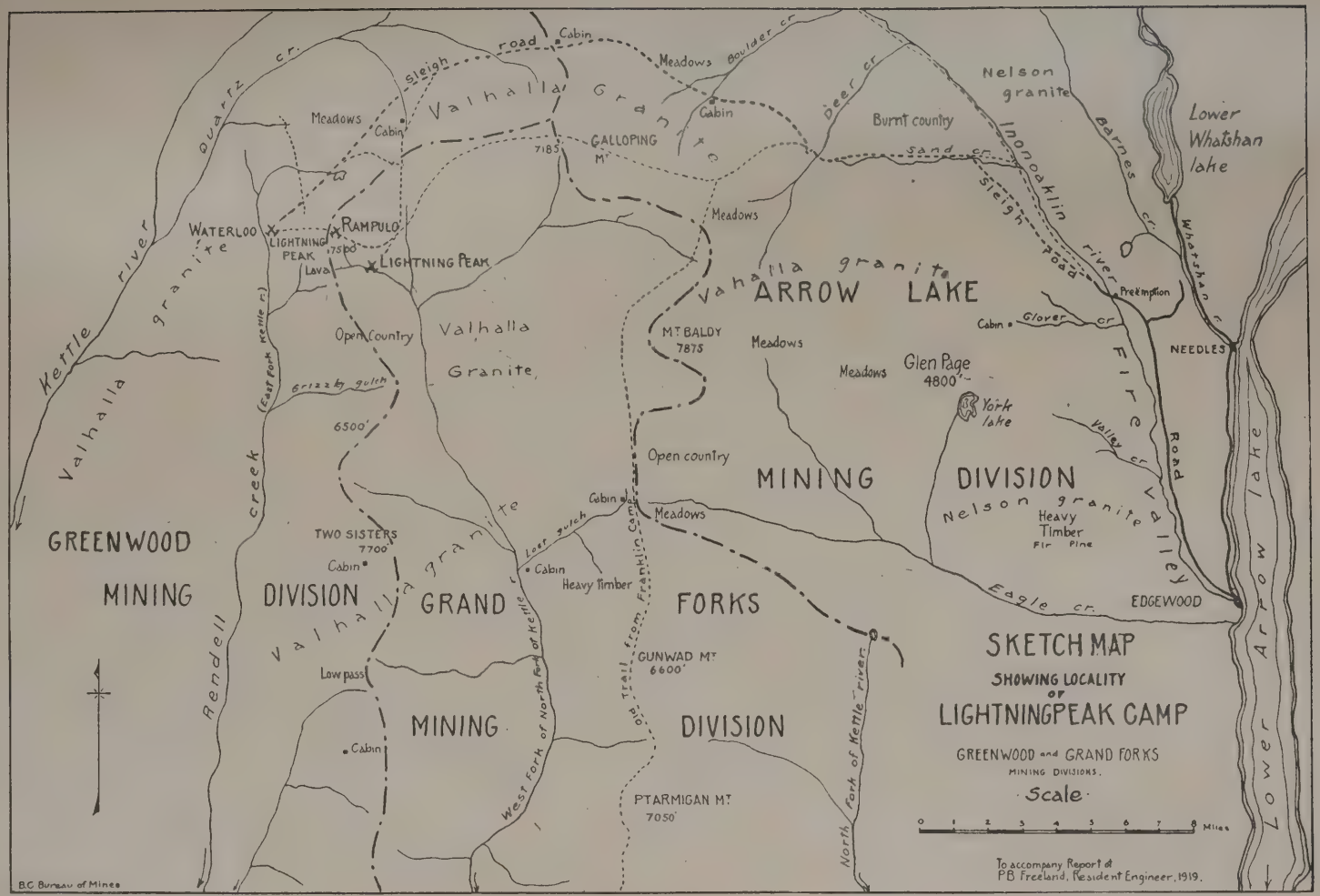
Kettle river
Valhalla granite
Quartz cr.
sleigh road
Cabin
Meadows
Boulder cr.
Deer cr.
Nelson granite
Burnt country
Sand cr.
Inonoaklin
Barnes cr.
Lower Whatshan lake
Whatshan R.
Valhalla Granite
GALLOPING Mt
7185
Meadows
Cabin
WATERLOO
LIGHTNING PEAK
1750
Lava
RAMPULO
LIGHTNING PEAK
Valhalla granite
ARROW LAKE
Sleigh road
river
Pre-emption
Cabin
Glover cr.
NEEDLES
Fire Road
Valley cr.
Open Country
Valhalla Granite
MT BALDY
7875
Meadows
Meadows
Glen Page
4800'
York lake
Grizzly gulch
6500'
Open country
MINING
DIVISION
Nelson granite
Heavy Timber
Fir Pine
Valley
Road
Cabin
Meadows
Loer gulch
Heavy Timber
EDGEWOOD
Eagle cr.
GREENWOOD
MINING
DIVISION
TWO SISTERS
7700'
Cabin
Rendell creek
(East Fork Kettle R.)
Valhalla granite
GRAND
FORKS
Old trail from Franklin Camp
GUNWAD Mt
6600'
Low pass
Cabin
MINING
DIVISION
West Fork of North Fork of Kettle R.
PTARMIGAN Mt
7050'
North Fork of Kettle River
Lower Arrow lake
SKETCH MAP
SHOWING LOCALITY
OF
LIGHTNINGPEAK CAMP
GREENWOOD and GRAND FORKS
MINING DIVISIONS.
Scale
0 1 2 3 4 5 6 7 8 Miles
To accompany Report of
P.B. Freeland, Resident Engineer, 1919.
B.C. Bureau of Mines

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ROSSLAND DISTRICT.

TRAIL CREEK MINING DIVISION.

Report by H. R. Townsend, Gold Commissioner.

No development worth speaking of has been made in this Division during the year 1919. A few claims have been staked and a few reverted claims leased.

The mines of the Consolidated Mining and Smelting Company of Canada, Limited, and the *Le Roi No. 2* have been operated to a limited extent, but the number of men employed has been very small in comparison with former years.

Office Statistics—Trail Creek Mining Division.

Free miners' certificates (individual)	124
Free miners' certificates (company)	6
Mineral claims located	23
Certificates of work recorded	59
Bills of sale, agreements, etc.	7
Certificates of improvements	2
Leases of reverted mineral claims	1

SOUTHERN DISTRICT (No. 4).

REPORT BY PHILIP B. FREELAND, RESIDENT ENGINEER.

INTRODUCTORY.

The above district includes four Mining Divisions—Grand Forks, Greenwood, Osoyoos, and Similkameen. The mineral production of this district is considerably below the average, chiefly owing to the closing-down of the Granby mines at Phoenix in June, 1919, on account of a shortage in coke for the smelter; a decrease in the bodies of possible payable ore added to the high cost of production.

In 1918 Granby produced 443,134 tons of ore, as against 143,086 tons in 1919, a difference of 300,048 tons.

The cessation of mining at Phoenix has reduced the output of copper to practically *nil*, and also materially cut down the production of gold and silver.

There have been no new discoveries of any particular importance in the district other than a few fissures of high-grade silver ore on Wallace mountain, Beaverdell. The scarcity of prospectors and capital, also the fact that large areas are Crown-granted on which no development has been carried on for many years, is the probable cause.

A great many of the Crown-granted areas are well mineralized, and though the ores are somewhat complex, the present facilities for power, transportation, and new methods of concentration and separation might make them attractive to capital, providing a large enough area for operation could be acquired at a reasonable figure.

A preliminary note is essential to the understanding of the "Taxation Act Amendment Act, 1916." As the law had stood, a Crown-granted mineral claim on which taxes were in arrears for a number of years was offered for sale by the Government at a regular *tax sale*, with arrears of taxes plus interest and charges and Crown-grant fee as an upset price. If no sale was made the property remained in the hands of the Assessor until desired by some one, when it could only be purchased by tender. It was not open to location under the "Mineral Act" and a prospector had no protection, and to relieve the situation this Act was passed.

Under the 1916 Act such reverted Crown-granted mineral claim may be obtained by any person under a lease for one year upon payment of $25, and a renewal of such lease may be granted for a further period of one year, but no longer. During the period of such lease the lessee has the right to enter, prospect, and mine on such Crown-granted mineral claim, and during such time the lessee has the option to purchase such Crown-granted mineral claim upon payment of all taxes, costs, and interest which remained due and unpaid on such claim on the date of its forfeiture to the Crown, together with all taxes and interest from the date of the lease to the date of application to purchase the Crown grant.

A person may only obtain a lease, or any interest in a lease, of two such claims in the same Mining Division.

Such leases are not transferable and are subject to the rights any person may already hold to any portion of the surface of such Crown-granted mineral claim.

One of the largest developed copper-mines, the *Copper Mountain* group at Princeton, having approximately 12,000,000 tons of low-grade ore, has not as yet begun operations. When this property begins to produce, the copper-output of the district will once more assume normal proportions.

The South Kootenay Power Company is constructing a high-power electric line from Greenwood to Princeton to supply the *Copper Mountain* mines and mill. It experienced a considerable amount of trouble during the early part of the year on account of a strike amongst the linemen employed. All the camps were closed down for several months. At the present time construction is proceeding. The route followed by this line is described in the British Columbia Annual Report, 1918.

The *Rock Candy* mine (the fluorite-deposit) is being developed steadily and the ore treated at the company's mill near Lynch creek. A good many problems in regard to concentration of fluorite by decrepitation have been overcome by the Company's chemists and the results are

satisfactory. The market for fluorite has fallen off considerably since the war ceased, and the long haulage to the different steel centres in the East cuts down the margin of profit to a minimum.

Total Tonnage and Content from District.

Mining Division.	Ore.	Gold.	Silver.	Copper.	Lead.
	Tons.	Oz.	Oz.	Lb.	Lb.
Greenwood	144,075	8,077	180,136	2,783,629	41,407
Grand Forks	43,934	573	11,241	483,846	1,793
Osoyoos	64,097	24,224	31,303	6,180	.....
Totals	252,106	32,874	222,680	3,273,655	43,200

GRAND FORKS MINING DIVISION.

On the receipt of some very good samples of highly altered limestones, carrying chalcopyrite and malachite, and reports from some prospectors who had visited Mount Faith, that there were possibilities of a fairly large body of low-grade copper, a visit was paid by the writer between September 2nd and September 9th.

Mount Faith lies approximately twenty miles in a northerly direction from the head of Christina lake and is reached by boat and trail. The country-rock exposed on the trail and for a distance of half a mile on each side was a coarse-grained muscovite granite varying in colour from grey to pink. In places there are highly siliceous bands carrying minute pyritohedrons of pyrite, but containing no other values.

Near the summit of Mount Faith (elevation 7,775 feet barometric) a small area of limestones was observed, most of which was unaltered. On the north-eastern slope, approximately half a mile from the summit, there is a small area of altered limestone capped with pyrrhotite and containing chalcopyrite, pyrite, and carbonate of copper. A hole 8 feet deep had been sunk in this and there were no apparent increases in values. Most of the chalcopyrite lay in the fractures of the limestone and in small inclusions close to the fractures.

The whole mineralized zone was only about 50 feet square. It is possible that further development might uncover larger ore-bodies, which would be essential to successful operation, considering the distance from transportation.

Lightning Peak and Extension (Equinox Group).—This property, situated approximately one mile east of Lightning Peak, was worked by W. A. Calder, assisted by two men. Development-work consists of the following: Shafts, 97 feet; tunnels, 150 feet; crosscuts, 37 feet; open-cuts, 50 feet. Ten tons of silver-lead ore was shipped to Trail smelter.

Rampulo. Situated south of Lightning Peak and owned by T. Cortiana. Development-work consists of 75 feet of open-cut and tunnel. The lead, which varies from a stringer to 18 inches, strikes north and south and dips approximately 70 degrees to the east, and carries silver, gold, lead, and zinc. The country-rock, which is mainly remnants of the sedimentaries, is cut by tongues of granite and considerably crushed and faulted, making development-work difficult. The gangue is quartz.

Fife Lime-quarries.—Situated on Christina lake and owned by the Consolidated Mining and Smelting Company, Trail. The limestone is used as a flux in the Trail smelter and about 17,000 tons was shipped in 1919.

Yankee Boy. This property, situated on Hardy mountain near Grand Forks, is under lease to J. Bailey, of Eholt, J. R. Nichol, *et al.* A considerable amount of development-work was done and some ore taken out, but not shipped. The ore is galena, argentite, with a small amount of tetrahedrite in a quartz gangue.

Union. This mine has been worked during the latter part of the year by the owners, Louis Johnson, Pat McGinnis, and J. McDonald, of Grand Forks. Eighty-one tons of ore was shipped to Trail, having an approximate content of 0.28 oz. in gold and 31 oz. in silver to the ton. An analysis of the ore shipped is as follows: Gold, 0.28 oz.; silver, 31 oz.; copper, 0.05 per cent.; zinc, 0.15 per cent.; sulphur, 1.6 per cent.; silica, 74.8 per cent.; iron, 4.40 per cent.; lime, 5.90 per cent. Development-work now being

carried on consists of a crosscut driven north from No. 2 tunnel, which exposed 22 feet of ore averaging about $20 in gold and silver, and a drift on the lead of about 20 feet.

Emma. Owned by the Consolidated Mining and Smelting Company, Trail. Strikes in the coal-mines were directly responsible for the closing-down of this mine during a part of the year. Resumption of work commenced in the autumn and 21,273 tons of low-grade copper ore was shipped to Trail, having a content of 524 oz. in gold, 730.2 oz. in silver, and 473,729 lb. of copper.

Berlin. Situated at Paulson and owned by the Inland Mining Company, Walla Walla, Wash. This mine has been closed down for a greater part of the year. About 6.5 tons of gold and silver ore was shipped to Trail, having a total content of 26 oz. in gold, 83 oz. in silver, and 117 lb. of copper. The ore consists of galena, chalcopyrite, and pyrite in a gangue of quartz. The ore occurs in fissures in an alkali syenite. Several hundred feet of development-work done.

Molly Gibson. This mine was developed spasmodically by contract throughout the year, some difficulty being experienced in getting men who would work by hand on the hard rock that was encountered in the crosscut tunnel. This tunnel, driven 265 feet, mostly through jasperoid, and approximately 60 feet below the old inclined shaft, struck some small stringers of ore, but not in commercial amounts. Work during the latter part of the year was confined to cleaning out the old inclined shaft and a short drift driven on the ore to ascertain, if possible, its strike and dip, which will facilitate further development in the crosscut. Assays from some samples taken from the bottom of the shaft gave $80 a ton in gold and silver.

Bertha Consolidated Gold Mining Co. and Pathfinder Mining Co.—The *Little Bertha* and *Pathfinder* mines are situated approximately sixteen miles north of Grand Forks on the east side of the North fork of the Kettle river. Both these mines were worked some years ago, chiefly by local capital, and a small quantity of ore shipped to the smelter.

The *Little Bertha* ore values are in gold and silver, associated with pyrite in a quartz gangue. The deposit is of the fissure type, varying in width from a fraction of an inch to 4 feet.

The *Pathfinder* ores are chiefly copper associated with pyrrhotite in a highly siliceous gangue. The deposit is a replacement in the sedimentaries, and badly disturbed by the intrusion of alkali-syenite dykes. The ore-bodies, as far as development has proved, are in small segregations and are uncommercial unless concentrated.

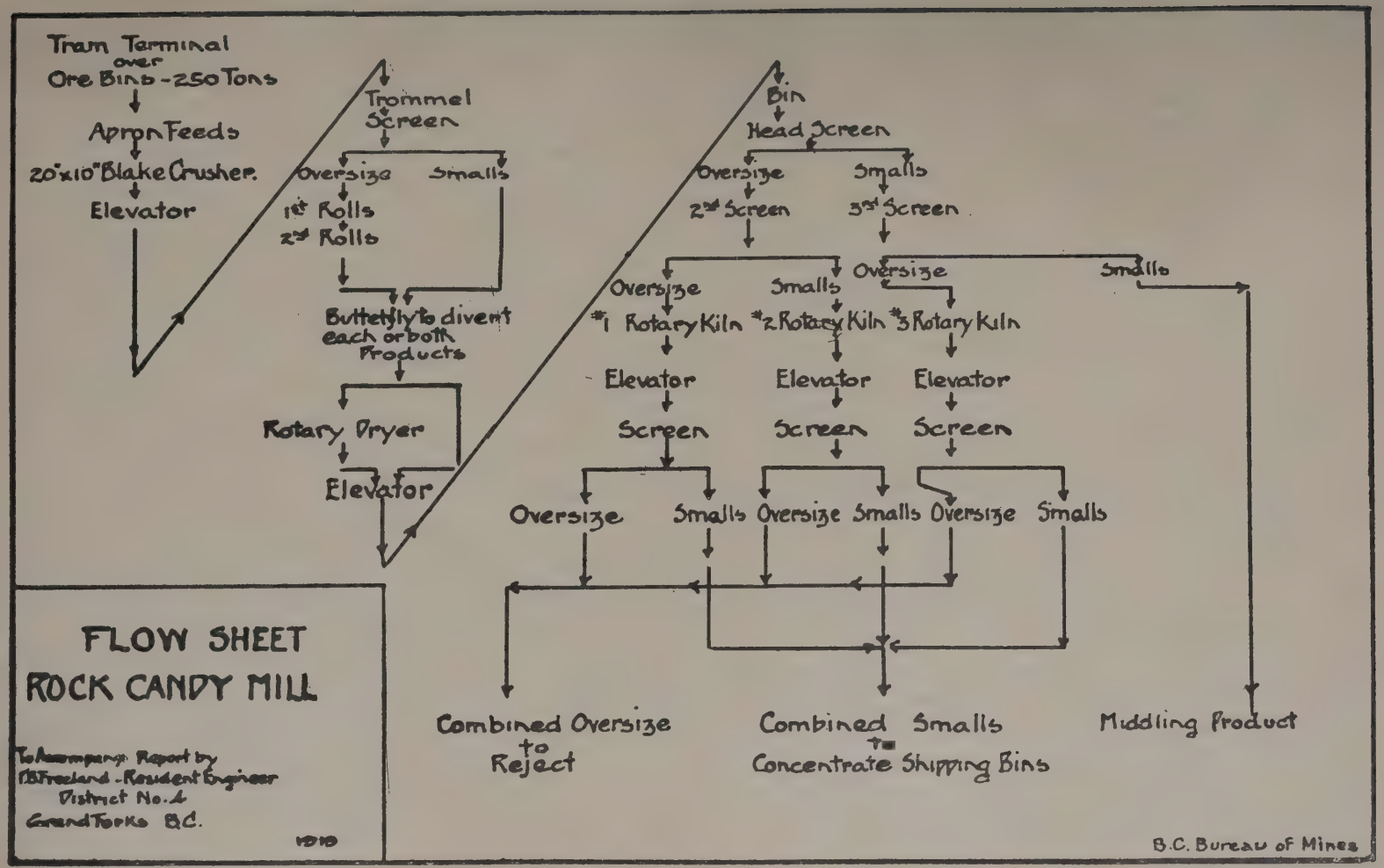
The former owners of both companies have entered into an agreement with Mr. Hayes *et al.*, of Spokane, Wash., with the result that a contract has been let to A. Savage, of Grand Forks, to drive a tunnel under the old workings of the *Little Bertha*.

Granby Smelter, Grand Forks.—Operations at this plant ceased in June owing to the shortage of coke caused by strikes in the coal-mines.

Rock Candy Group. Situated on Kennedy creek, a tributary of the North fork of the Kettle river. This group consists of the *Rock Candy*, *Tadanac*, *Rabbit*, *Portal No. 1*, *Portal No. 2*, *Fluorspar Fraction*, and *Decimal Fraction*, and contains 267.8 acres. The Consolidated Mining and Smelting Company, of Trail, which owns the property, has done a considerable amount of development-work, as shown on the accompanying map. During the early part of the year an aerial tram-line, two miles long from the mine to the mill, was completed; also bunkers, log bunk-houses, kitchen, and offices constructed at the mine.

The first development-work consisted of diamond-drilling, which was not entirely successful owing to the difficulty of saving the disintegrated ledge-matter in the core-barrels. A crosscut was then started 35 feet above Kennedy creek and driven 100 feet before the ledge material was struck. This crosscut was continued through the deposit for a considerable distance. The deposit, approximately 140 feet wide, on this level was considerably crushed and contained stringers of chert, kaolin, barite, and quartz, with only two commercial bodies of fluorite, varying from 3 to 7 feet. In this lead-matter occurred inclusions of chalcopyrite, limonite, galena, chalcocite, pyrite, and covellite, with large tabular crystals of barite in the cavities. The limonite, chalcocite, and covellite are secondary minerals.

The deposit formed near the surface, under low temperature conditions, may not be expected to persist in depth. The rocks lying to the east of the deposit are phases of alkali syenite (*see* Brock's report), whilst those to the west, with coarse phenocrysts of feldspar, evidently belong to the group referred to as alkali syenite porphyry, and are of late Tertiary age.


Tram Terminal over Ore Bins - 250 Tons
Apron Feeds
20"x10" Blake Crusher
Elevator
Trommel Screen
Oversize
Smalls
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2nd Rolls
Butterfly to divert each or both Products
Rotary Dryer
Elevator
Bin
Head Screen
Oversize
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2nd Screen
3rd Screen
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Combined Oversize to Reject
Combined Smalls to Concentrate Shipping Bins
Middling Product
FLOW SHEET
ROCK CANDY MILL
To accompany Report by
P.B. Freeland - Resident Engineer
District No. 1
Grand Forks B.C.
1910
B.C. Bureau of Mines

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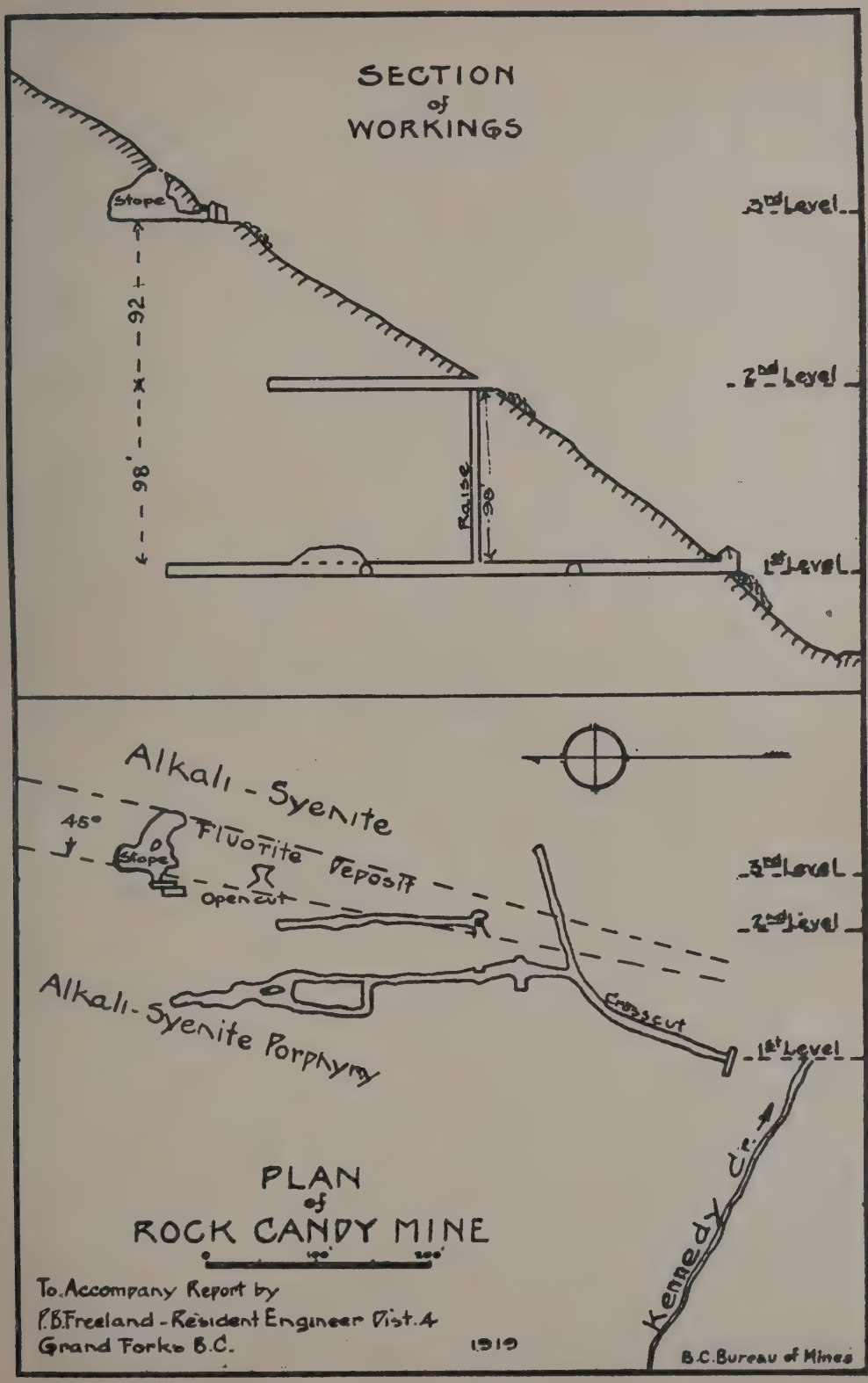
SECTION
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WORKINGS
Stope
3rd Level
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92'
98'
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90'
Alkali - Syenite
45°
Fluorite Deposit
Stope
Open cut
3rd Level
2nd Level
Alkali - Syenite Porphyry
Crosscut
1st Level
Kennedy Cr.
PLAN
of
ROCK CANDY MINE
To Accompany Report by
P.B. Freeland - Resident Engineer Dist. 4
Grand Forks B.C.
1919
B.C. Bureau of Mines

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A drift was started from No. 1 crosscut and continued for a considerable distance, following the commercial fluorite-deposit in the foot-wall; then another crosscut was driven east from the tunnel and a deposit on the hanging-wall encountered and drifted in, as shown on the map. An upraise has been put in between No. 1 and No. 2 to facilitate the handling of the ore from above; No. 2 will be driven under No. 3 and the ore from the stope taken out through No. 2 and No. 1. The deposit at No. 3 level is about 50 feet wide and contains a good grade of fluorite. The colour of the fluorite varies from a deep purple to a green and white. This colour does not seem to influence the percentage of CaF_2 in the rock.

The occurrences of iron and copper sulphides, which fortunately are only in small segregations, are very detrimental to the commercial value of the fluorite, and a good deal of otherwise high-grade ore has to be discarded on this account. No profitable means, at present, have been found to eliminate the sulphides. That there is a certain amount of redeposition going on is apparent in the lower tunnel, where a fresh break on the rock is in a few days covered by a thin film of fluorescent hue. Tons mined, 5,442; men employed, 26.

Rock Candy Mill.—The building of this 100-ton capacity mill by the Consolidated Mining and Smelting Company, of Trail, was more or less of an experiment in the first place, which has been added to and changed according to necessity. The results obtained to date are satisfactory from a concentration standpoint and reflect credit upon those who have worked upon its solution.

The fluorite is brought approximately two miles from the mine to the mill over an aerial tram, and then dumped in bins of 250 tons capacity. From thence it is distributed by apron feeds through a 20- x 10-inch Blake crusher and elevated to a trommel screen of ¼-inch mesh, the oversize passing through two sets of rolls set to ⅜ inch and ¼ inch respectively. All products then pass through a rotary dryer 14 feet long and 3 feet 2 inches in diameter, which is heated by the waste gases from the kilns. This product is again elevated and passed over three sets of impact screens, the feed for No. 1 kiln being plus ¼ inch, No. 2 kiln being minus ¼ inch or plus No. 8, and No. 3 kiln being minus No. 8 or plus No. 15.

The minus No. 15 makes up the middling product. The smalls from No. 2 screen give the best results for decrepitation, making a product containing about 2 per cent. silica. The rotary kilns are 14 feet long and 3 feet 2 inches wide and make 3 revolutions a minute. About 1,200° Fahr. is the necessary temperature for decrepitation. The middling product contains about 5 per cent. silica and is used locally for making acid, and also for adjusting the concentrates to meet specifications. After decrepitation takes place the product is slowly elevated to permit cooling before being finally screened and stored ready for shipment.

As far as the writer is aware, this is the only mill of its kind on the American Continent and the success achieved may be instrumental in solving other problems of a similar nature elsewhere. Sixteen men were employed and 3,372 tons milled, which produced 898 tons of concentrates, with an approximate content of 84 per cent. CaF_2 and 6 per cent. SiO_2.

Maple Leaf. Owned and worked by the Maple Leaf Mines Company and situated approximately forty-four miles north of Grand Forks. H. W. Young, of Grand Forks, is manager of the property and is responsible for all the new development and construction carried on for the past few years. Development for 1919 is as follows: Lower tunnel, 160 feet; crosscut, 100 feet. A 3-drill compressor and gasolene-engine were installed and housed, also an assay office.

The lower tunnel has been driven about due west into the hill. At the mouth of this tunnel a coarse brownish-red tuff, highly altered to sericite and chlorite and containing small amounts of limonite and hæmatite, was cut. In the fractures of this rock a considerable amount of native copper was apparent. About 10 feet in from the mouth of the tunnel the native copper was replaced by minute particles of iron and copper sulphides, the latter disappearing almost entirely as the tunnel was driven farther into the hill. Near the face of the tunnel a finer-grained volcanic tuff was encountered and a microscopic examination showed small pyritohedrons of pyrite scattered through the rock. A few of the pyrite crystals contained minute quantities of chalcopyrite and gold, but not in sufficient quantities to make the rock commercial.

The manager of the mine was able to get in his own assay office between 18 and 20 per cent. of lead from some of the samples taken from the mine. Other samples brought down by the manager were found to contain no lead, and no lead minerals could be discovered under a high-power microscope. One of the buttons obtained by the manager was tested and found to be lead.

It is possible that the samples brought down and sent to the Department of Mines to be assayed differed from those tested by the manager, and it will be interesting to receive the pulps of the samples from which the manager obtained such a high percentage of lead. Until this is done it is impossible to state absolutely that there is no lead present.

The formation a short distance to the north and east of the workings is cut by a porphyry dyke, which has caused a considerable amount of fracturing. These fractures have been filled, largely with sericite, kaolin, and silica, and showed calcite and limonite replacing the pyritohedrons of iron. Under the microscope many of the pyrite-grains were shown to be hollowed out, leaving a thin shell filled with powdery limonite. Whether this mine has a future as a low-grade copper property remains to be proved, and future development along these lines is looked forward to with interest.

GREENWOOD MINING DIVISION.

Granby Consolidated Mining and Smelting Co., Phoenix.—The mines of this company at Phoenix were operated until June 18th, 1919, when operations ceased on account of the coal strike at Fernie, necessitating the closing-down of the company's smelter at Grand Forks. Since that time work has not been resumed, owing probably to the depletion of the larger ore-bodies in the mine and the extreme high costs of operation. Development-work consisted of 1,908 feet of raising and 55 feet of drifting.

Stemwinder. Leased by Joe Cunningham, of Phoenix, and 29 tons of copper and gold ore shipped. The ore was sorted from the dump. This mine was first started in 1891 by James Attwood and James Schofield and was afterwards sold to the Dominion Copper Company, which did considerable development-work in open-cuts, 400 feet of inclined shaft, and a crosscut 75 feet long, besides other minor workings. For the past ten years nothing has been done in the mine and the workings are filled with water.

Two ore-bodies were stated to have been cut, being 18 and 30 feet respectively. The ore-body is situated along the western border of a lens of crystalline limestone which is brecciated and in part replaced by epidote and quartz. The ore strikes in a northerly direction and dips vertically. In the "glory-hole" the body was 110 feet long, 60 feet wide, and 40 feet deep. It is not certain that the lower ore-bodies belong to this surface body. The ore consists of chalcopyrite, hæmatite, and pyrite in a gangue of calcite, quartz, and epidote.

Providence. This mine, situated one mile north of the town of Greenwood, has been operated under lease by Al. Morrison and W. McGillis, of Greenwood. The rock surrounding the mine is a green tuff near a contact with granodiorite. The vein, which is chiefly quartz, with small particles of calcite, averages about 1 foot in width and occurs in the tuff. An alkali-porphyry dyke cuts the formation in an easterly and westerly direction and has evidently disturbed the vein to a very considerable extent, causing a divergence of the strike of the vein of about 20 degrees. The strike is approximately north and south, dipping 60 degrees to the east.

There appears to be some replacement in the green tuff, occurring in silicified and pyritized veinlets. The ore is galena, zinc pyrite, chalcopyrite, tetrahedrite, argentite, pyrargyrite, and native silver and gold. There has evidently been some secondary enrichment, caused by surface waters. On the 400-foot level there is still a considerable amount of ruby-silver in the lead.

The present owners have installed an electric compressor with a capacity of 600 cubic feet of air, and also pumps, with which they have unwatered the old shaft down to the 500-foot level. Development consists of 260 feet of drifting in a southerly direction on the 300-foot level and 216 feet in the 400-foot level, with 80 feet of raising between the 300- and 400-foot levels.

Shipments were made to the smelters amounting to 338 tons, with a total content of 267 oz. of gold, 38,903 oz. of silver, and 7,616 lb. of lead. Cost of treatment, about $5.50 a ton; rail transportation, $5.50 a ton.

B.C. Leased by J. St. Claire and approximately 120 tons of copper ore shipped to Trail. The mine was originally owned by the British Columbia Chartered Company, Limited, and afterwards by the British Columbia Copper Company, which in turn leased it to A. Luciani, of Phoenix. A detailed description of the geology and ore-bodies of this mine is to be found in the Summary Report of the Geological Survey, Ottawa, 1902, by R. W. Brock, who had an opportunity to visit the mine whilst in operation. All the

lower workings are now filled with water. The ore taken out of this mine averaged 5.8 per cent. copper, 2.45 oz. in silver, and 0.015 in gold.

According to data, the diamond-drill holes, driven to a depth of 911 feet, cut several bodies of ore, but a large proportion of the core was alkali porphyry. It is unfortunate that the exact data derived from these drill-holes are not available, because up-to-date machinery and concentration methods might make the reopening of this mine profitable.

Don Pedro. Owned by Chas. Johnson, of Greenwood, and leased to Leo. Sartoine, who shipped 18 tons of ore to Trail, having a total content of 4 oz. of gold and 1,864 oz. of silver. The ore is galena, zinc pyrite, and tetrahedrite in a gangue of quartz and calcite.

Lumpy. This claim was developed by Walter A. Johnstone *et al.*, of Edgewood. The ore occurred in small stringers and segregations in an altered limestone, close to the contact of a granite-mass, and consisted of galena, pyrargyrite, and native silver. A considerable amount of development was done to try and trace the continuance of this lead at depth, but without satisfactory results. The claim is situated on the north slope of Lightning peak.

Dictator and Cloriator. Owned by J. Glover, of Edgewood, and situated about three miles in a north-easterly direction from the *Waterloo* mine on the headwaters of the East fork of the main Kettle river. The country-rock surrounding the claims is a medium coarse grey granite, occasionally cut by porphyry dykes. The ore consists of galena, sphalerite, and iron, carrying gold and silver, in a gangue of quartz and broken country-rock. The vein has a northerly and southerly strike, dipping 75 degrees to the west. The lead, which outcrops for about 300 feet, is developed by open-cuts and shafts varying from 10 to 30 feet in depth. Owing to the bad state of repair of the deepest shaft it was impossible to visit it, but the owner claims an 18-inch lead in the bottom. The flatness of the surrounding country prohibits any development by tunnels, and the cost of sinking the shafts farther is beyond the means of the present owner.

Carmi. This mine was bonded to San Francisco interests in 1919 and H. H. Sawyer is in charge. The present company has commenced the construction of a concentration plant to treat the ores. A definite plan of treatment has not been decided upon, but will probably consist of a suitable crushing plant followed by oil-flotation. Development-work consists of an extension of the lower tunnel about 100 feet. The lead in this tunnel strikes north-east and south-west and dips nearly vertical, being frequently offset by cross-faults. The ore consists of sphalerite, chalcopyrite, pyrite, and galena in a gangue of quartz, ankerite, and in places an intensely sericitized dyke material. It is to be hoped that the shaft will be unwatered and a good deal more development-work done before a plant to concentrate the ores is finally constructed.

Waterloo. Owned by G. A. Rendall *et al.*, of Greenwood. Three men were employed and a new sleigh-road cut out to join the main sleigh-road near Galloping mountain. Development-work consisted of driving a tunnel below No. 1, the dimensions of which are not to hand. Ore was struck in this tunnel and a shipment of 13 tons made. About 100 feet to the west of the workings the limestone is invaded by a granite-mass which has an easterly and westerly strike and dips about 45 degrees to the north. Tongues of granite cut the limestone in the vicinity of the lower workings, altering the lime to a dark-grey colour.

The vein-filling is chiefly calcite and in some of the lower workings the minerals, such as zinc, galena, and pyrargyrite, appear in isolated segregations a few inches apart and about ½ inch in diameter, each segregation containing either pure galena, zinc, or pyrargyrite, as the case may be.

Wallace Mountain.

Most of the properties referred to below have been geologically discussed by Mr. Reinecke in the Geological Survey, Memoir 79, and since that time no theories have been worked out on the ground whereby any reliable system of the dipping and faulting of the veins can be followed. There seems to be no general relation between the direction of the fault-planes or the amount of the displacement.

Bell. Owned by Duncan McIntosh and Pat Crane, of Greenwood. Nine men were employed throughout the season and 294 tons of ore shipped to Trail, containing 6 oz. of gold, 52,612 oz. of silver, and 18,256 lb. of lead. Development consisted of the following: Drifting, 699 feet; raising, 65 feet; new roads, 2,600 feet. A new dining-hall was constructed, also a bunk-house and two dwelling-houses remodelled and repaired.

Several new veins were uncovered to the north and east of the old workings, carrying high values in silver. These leads varied in width from 1 to 18 inches and were displaced by faults in a short distance. In some cases a high-grade vein of lead ore will change, after faulting, to a low-grade zinc ore.

Duncan. This property was leased to McKellar, J. Dale, and P. Crane, and later to Mr. Bailey, of Eholt. In 1904 this property was acquired by the Wallace Mountain Mining Company and development consisted of shafts and tunnels. About 200 tons of ore was shipped. In 1911 this company ceased operations. Since that time very little has been done until the above lease was taken, when the lower drift was extended 100 feet and two lots shipped, divided as follows: First lot, 13 tons, carrying 0.03 oz. of gold, 112.4 oz. of silver, and 4.10 lb. of lead; second lot, 17 tons, carrying 0.01 oz. of gold, 75.70 oz. of silver, and 3.10 lb. lead. The lead varied in size from a few inches to 14 inches and at the end of the new tunnel became too low grade for profitable shipping purposes.

Buster. This claim is owned by the Alaska Mining Company and is now operated by Joe Kelly. A small shipment was made of 8 tons, assaying 81.10 oz. of silver to the ton, 3.10 per cent. of lead, and 11.20 per cent. of zinc. The lead is somewhat broken and varies from a few inches to 3 feet wide. The ore contains tetrahedrite, galena, sphalerite, and pyrite in a quartz-sericite gangue.

Castor Frac.—Leased by J. Perry *et al.*, of Greenwood, and 35 tons of silver ore shipped to Trail. About 200 feet of tunnels was driven.

Napanee Group. The owner of this property, M. J. Cummings, has done several hundred feet of development-work, which has been dealt with in other reports. In 1918 the first indications of silver-lead were discovered near the mouth of a crosscut tunnel. This amounted to float in the shape of boulders and some carbonates in the gravel-wash. On the supposition that this ore came from a lead close at hand, the owners carried out extensive development-work, but at the date of the writer's visit no trace of ore in-place could be found.

In the vicinity of the discovery about 10 feet of gravel-wash overlies the country-rock, which makes exploration a difficult matter. As there are no other indications of silver-lead ores in the immediate neighbourhood, it is possible that this float has been carried for some distance. One ton of this ore was shipped to Trail, assaying 0.14 oz. of gold, 68.4 oz. of silver, and 15.2 lb. of lead.

Rob Roy. This mine is included in the *Sally* group and nearly all the past year's development-work has been done upon it. The property is now owned by the Wallace Mountain Mines, Limited, with H. B. Morley, of Penticton, as secretary. About twelve men were employed during part of the season and 145 tons of ore shipped to Trail, having a total content of 3 oz. of gold, 21,092 oz. of silver, and 7,735 lb. of lead.

The ore occurs in shear-zones in an acid quartz diorite and dips generally about 55 degrees to the south. Its character consists of galena, pyrite, sphalerite, tetrahedrite, and pyrargyrite, and is in a gangue of sericite, quartz, and altered diorite. A crosscut was driven in the upper tunnel and the ore-body cut and drifted on for over 100 feet. The width of the lead varied from 1 inch to 2 feet and carried a considerable amount of tetrahedrite. Both overhand and underhand stoping were resorted to and a considerable amount of ore shipped.

As the ore seemed to persist at the bottom of the underhand stopes, the management deemed it advisable to extend the lower tunnel 60 feet below to facilitate the handling of the ore. At the time of writing this report no ore had been struck in this tunnel. The ore in the upper tunnel follows a pink aplite dyke and is probably the same one referred to by Mr. Reinecke in his Memoir 79, and regarded by him as probably intruded at the time of the ore-deposition. This theory seems to have been borne out in this instance.

Revenge. The owner, J. M. Barrett, leased this property to Oscar Lachmund, J. Hoffstetter, and P. Crane. Several open-cuts on the lead and crosscut tunnels driven below to develop it at depth summed up the development of this property before the lease was taken. The lessees continued the lower drift on the lead for 80 feet

Canada Copper Corporation, showing Railway up Similkameen River to Concentrator.

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Placer Development Co. of America—Sluice, Tulameen River.

Stevenson's Claim, Summit Camp, Similkameen M.D.

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and stoped out 26 tons of ore, assaying 0.13 oz. in gold, 102.20 oz. in silver, and 5.80 lb. of lead to the ton.

The ore carried a high percentage of zinc and had to be sorted closely to avoid heavy penalty charges from the smelter. The country-rock is a quartz diorite and the ore occurs in shear-zones displaced by numerous faults.

Standard Frac.—This claim was under lease to E. Nordman and Sons, of Coltern. Two men were employed and 27 tons of ore taken out, containing 3,360 oz. of silver and a small amount of lead.

Bounty Frac.—A lease was given on this property to Carl Carlson, Harry Anderson, and Robt. Neill. The old shaft was cleaned out and some surface work done, and 40 feet of development done in the drifts without finding any new bodies of ore. Work continued for two months and a half and 8 tons of ore was shipped to Trail, carrying 945 oz. of silver and 451 lb. of lead.

Trapper. This claim is situated close to the main Kettle river on the main wagon-road and about eighteen miles distant from Westbridge, on the Kettle Valley Railway. No work has been done on these claims for many years and the old shaft, sunk close to the present wagon-road, has been partly filled in. This shaft is said to be about 25 feet deep and has a short drift from the bottom of it on the lead. The lead, as far as could be seen, has a general strike of N. 45° W. and dips nearly perpendicular. The vein varies from 3 feet to a few inches and contains a high percentage of quartz and disintegrated country-rock. The minerals are pyrite, pyrrhotite, limonite, gold, and silver. A sample taken across the lead above the tunnel and containing a high percentage of limonite carried 3.22 oz. in gold and 2 oz. in silver. This return is probably a good deal higher than the average ore will run.

About 300 feet west of the above shaft two small open-cuts were put in on another lead, striking E. 2° W. and dipping 50 degrees to the north. The ore lies in stringers up to 2 inches in width and consists of pyrite and pyrrhotite, with a small quantity of gold and silver. Owing to the heavy covering of gravel-wash it was difficult to find any outcrops of the country-rock. In the vicinity of the leads the rocks appeared to be a cherty quartzite.

OSOYOOS MINING DIVISION.

Spotted Lake.—This lake contains a deposit of magnesium and sodium sulphates and is owned by the Stewart-Calvert Company, of Oroville, Wash. The termination of the war created a slump in the demand for magnesium sulphate, which accounted for the reduction of tonnage shipped from this lake during the year. About 120 tons was hauled by motor-trucks to the company's plant at Oroville, but it was not treated.

Nickel Plate.—The Hedley Gold Mining Company operates this mine near Hedley. About eighty-five men were employed by the company in the mine and on the surface. A total of 62,907 tons of ore was mined, which produced $17,998,478 from cyanidation and $6,136.47 from concentration.

Horn Silver Mine. This mine is owned and has been continuously operated throughout the year by the Condit Bros. and Powell Bros., of Similkameen and Victoria. Development for the year was confined to No. 2 and No. 3 levels. On No. 2 level 445 feet of crosscuts and tunnels were driven, and the vein, where encountered, showed an average width of 4½ feet of ore carrying about 40 oz. in silver. As development extended to the east the vein increased in width. This lead was continuously faulted to the south, the displacement varying from a few inches to a maximum of 7 feet.

At a point 300 feet from the portal of No. 2 level a crosscut was driven N. 11° E. for 200 feet, cutting what is known as the north vein at 175 feet. The lead here varies in width from 18 inches to 2 feet and it contains a considerable amount of native silver and argentite. No assays of this ore are to hand. No. 3 tunnel was driven 80 feet on the dip of the vein below No. 2. The ore in this tunnel is a good shipping grade and averages 3 feet in width.

The ores are pyrargyrite, argentite, native silver, and gold in a gangue of quartz. Total shipments for the year amounted to 1,049 tons, with a total content of 84 oz. of gold and 30,911 oz. in silver. About seventeen men were employed during the year.

Golconda.—This mine is situated about one mile in a westerly direction from Olalla and is owned by McEachern Bros., of Keremeos. Twenty tons of copper and gold ore was shipped to Trail smelter.

INDEPENDENCE MOUNTAIN.

This mountain forms part of the Okanagan range, situated north of the Similkameen river, between Keremeos creek and 20-Mile creek, and has an elevation of about 6,400 feet (barometric). This mountain and surrounding country can be reached by an old wagon-road which branches from the main Penticton-Keremeos road near its summit.

The greater part of Independence mountain is covered by Crown-granted mineral claims, some of which were visited by the writer; i.e., *Gem* group, owned by J. McNulty, Hedley; *Lake View*, owned by R. H. Northey, Olalla; *White Grouse*, owned by W. Darymple, Princeton; *Dominion* group, owned by Alex. Ford, Joyce P.O.; *Connell Fraction*, owned by J. McNulty & Matheson, Hedley; *Amasis*, owned by J. McNulty, Hedley; *Goldsmith*, owned by J. McNulty *et al.*, Hedley; *Apex* group.

Geology.—The country-rocks in the vicinity of Independence mountain are limestones, quartzites, and argillites, all highly metamorphosed and broken. The general strike is north-east and south-west, dipping nearly perpendicular. According to Chas. Camsell, of the Geological Survey, these rocks are similar in structure and lithological character to the rocks (Palæozoic) of the Nickel Plate mountain, which lies across the valley to the west, and on which is the *Nickel Plate* mine.

The Palæozoic rocks are intruded in many places by diorite, diorite porphyry, andesite, and granite porphyry, and to the north by a granite batholith. The intrusion of these igneous rocks into the sedimentaries has produced contact metamorphism, altering the limestones into lime silicates, garnet, epidote, pyroxene, and hornblende. Most of the mineral-deposits are in the sedimentaries, especially the limestones, and appear to be genetically connected with the diorite and diorite porphyry. They are mainly of contact-metamorphic origin, having a copper-gold content.

The metallic minerals appear to be pyrrhotite, chalcopyrite, pyrite, magnetite, with a little arsenopyrite in a gangue of calcite, and epidote garnetite.

The ore-bodies have not been developed sufficiently to prove their character, but judging from surface exposures they are very irregular in shape, with no definite walls.

Development.—*Gem* group, tunnels 240 feet, open-cuts 50 feet; *Lake View*, shaft 15 feet, open-cuts 100 feet; *White Grouse*, shaft 10 feet, open-cuts 50 feet; *Dominion* group, shaft filled with water, open-cuts 25 feet, trench 50 feet; *Connell Fraction*, shaft 8 feet, open-cuts 220 feet; *Goldsmith*, open-cuts 25 feet; *Apex* group, shaft 150 feet, tunnel 200 feet.

Samples were taken from some of the old workings on the *Dominion* and *Lake View* claims, with the following result:—*Dominion:* Gold, trace; silver, trace; copper, 0.70 per cent. *Lake View:* Gold, trace; silver, trace; copper, 0.50 per cent.

These assays can hardly be called an average of the deposits, because the workings were in such a state as to prohibit the taking of a proper sample. Some high assays in gold have been obtained from picked specimens in different localities on Independence mountain, and these are probably due to the presence of arsenopyrite, which seems to carry increased gold values.

SIMILKAMEEN MINING DIVISION.

CANADA COPPER CORPORATION, ALLENBY.

Active operations have been delayed on this company's property on Copper mountain owing to a strike on the railroad-construction between Princeton and the mine. The following is a résumé of work done, kindly furnished by the management of the company:—

"Work during 1919 has been chiefly in construction of surface plant and installation of machinery and equipment preparatory to commencement of operations. We have been obliged to revise our plans for completion from time to time owing to non-completion of the branch line of railway from Princeton to Copper mountain and of the power-transmission line from Greenwood; delay which is proving very costly.

"At Allenby the work comprises the following: Concentration-plant building (commenced December, 1918) has been completed. All machinery for same received and installed, with exception of power-transmission shafting and belting. The shafting is on the ground and will be installed forthwith; the belting will not be installed until next spring. Permanent pumping plant at South Similkameen river completed ready for electric power. Additional water-lines for industrial, domestic, and fire-protection systems installed. Heating plant with battery of four 100-horse-power boilers completed. Assay office and laboratory building erected.

"On February 6th a skeleton track was completed to Allenby, on the Kettle Valley branch line from Princeton, which permitted the delivery of about forty car-loads of machinery and material. The ties were laid on top of frozen ground and traffic had to be suspended as soon as the spring thaw commenced. Following this and before the road was ballasted, a strike of railroad-construction employees was called on April 1st, and further deliveries did not take place until the end of August, at which time some thirty-odd car-loads of machinery and equipment were waiting delivery in the Princeton yards. Traffic has been maintained to Allenby since that time, but completion of the road to Copper mountain will be delayed until the early summer of 1920.

"*Copper Mountain Mine.*—Work at this property has been carried forward throughout the year to December 1st, when the camp was closed down for the winter, with the exception of a small crew on replacing temporary underground trackage with permanent track. Progress has been retarded by railroad and scarcity of labour, but sufficient time will be found in the spring to complete all necessary work for commencement of mining operations at a date when the railroad will be ready to transport ore to the mill at Allenby. Following is a brief résumé of work accomplished during the year:—

"*Underground.*—Timbering main shaft and stations; enlarging haulage levels and timbering where necessary; main ore-passage from surface, 4,073-foot level, completed; installing dumping-stations and loading-chutes; raising and drifting.

"*Surface.*—Temporary power plant; head-frame for shaft; temporary compressor plant dismantled and replaced with permanent plant; air-lines; hoist-house and hoist; concrete powder-magazine; addition to dining-hall; steel-sharpening shop; laundry building; extending telephone system; primary bins and crushing plant, with trestle and trackage connecting with portal of 3,170-foot level tunnel complete with foundations ready to receive crushers; conveyor-house from crushing plant to shipping ore-bins ready for installation of conveyor; main storage (or shipping) ore-bins of 'straddle' type completed; surface tramway from railroad-station site to 3,170-foot tunnel level for transportation of incoming supplies.

"*Railroad.*—Following are approximate percentages of completion of various classes of work: Grading, 85 per cent.; tunnels, 50 per cent.; bridges, 40 per cent.; track-laying, 40 per cent.; ballasting, 10 per cent.

"*Wagon-roads.*—A large quantity of material had to be hauled by motor-truck and teams to Allenby and Copper mountain, as a result of which the main Government road was subjected to heavy and continuous traffic throughout the year, and we wish to record our appreciation of the speedy measures taken in making much-needed repairs when the matter was brought to the attention of the Minister of Public Works and the District Road Engineer. We would mention that, in addition to moneys spent by the Government, we have spent during the year for new roads and maintenance of local roads the sum of $5,350."

Shamrock Group.

This group consists of six claims—*Ben Hur*, *Shamrock*, *Blue Ridge*, *Dixie*, *Belemnite*, and *Bornite*—and is owned by Cox & Uhler, of Princeton. These claims are situated approximately four miles east of Princeton, close to the main Hedley-Princeton wagon-road on the north side of the Similkameen river, and approximately 4,500 feet from the Great Northern Railway.

Geology and Ore-bodies.—The country-rock, lying to the east of the mountain on which the claims lie, is chiefly of a basic variety, overlain by remnants of the sedimentaries and intruded by pulaskite and quartz-porphyry dykes. To the west of this mineralized area the igneous rock is a monzonite, which is probably part of the batholith so much in evidence to the south across the Similkameen river.

The quartz-porphyry dyke on the *Bornite* claim is about 75 feet wide, has a general north-and-south strike, and outcrops over several claims. This dyke contains small specks of chalcopyrite and pyrite and is probably the source of some of the ore-deposition in its locality.

Development.—Nearly all the development-work has been done on the *Blue Ridge* claim, which lies on the southern slope of the mountain facing the Similkameen River valley. This amounts to over 200 feet of drifting and crosscutting. At the mouth of the lower tunnel a highly altered remnant of the sedimentaries was cut, containing epidote and garnetite, with inclusions of chalcopyrite and pyrite. From thence the tunnel followed a fissure in a dark-grey fine-grained basic rock. This fissure varied considerably in width, from ½ inch to 3 feet, and was mineralized for over 10 inches for 20 feet, but for the most part was only from 1 to 2 inches

wide. Where the ore widened, 10 tons was stoped out and shipped to the Granby smelter at Grand Forks. This shipment carried 15 per cent. copper.

On this side of the mountain, in spite of the many open-cuts and tunnels, no workable ore-bodies have been discovered, with the exception of the above-mentioned body, which was stoped out. It is probable that there has not been a sufficient amount of fracturing in the country-rock to allow any egress for mineral-carrying solutions, and the older sedimentaries have been eroded off to such an extent that there are only small remnants left. On the east side of the mountain a comparatively small amount of work has been done, chiefly on the remnants of the limestones where they showed some mineralization. There seems to be a better opportunity for finding any ore closer to the quartz-porphyry dyke, and it is in this direction that the owners intend to do their development in future.

Summit Camp.

Indiana. This claim is situated near the headwaters of Amberty creek, which flows into the Tulameen river. Development-work consists of about 340 feet of tunnels and crosscuts. The lead near the mouth of the main tunnel averages 3 feet 6 inches for 20 feet and contains silver-lead and zinc in a gangue of calcite mixed with quartz, and strikes south-west. From this point, 20 feet from the mouth, the tunnel follows a stringer of ore varying from ½ to 3 inches and carrying silver, lead, zinc, and iron in the same gangue. Several crosscuts were driven from the main tunnel in hopes of finding a larger body of ore, but without success. The country-rock appears to be a highly siliceous argillite. No work has been done upon this claim for many years.

Stevenson. This claim adjoins the *Indiana* on the south-west and is owned by R. Stevenson, of Princeton. Development-work consists of an open-cut, at the end of which a shaft 10 feet deep has been sunk in the lead, also other cuts and some stripping. Unfortunately the shaft which was sunk in the lead was full of snow and water, so that a proper examination was impossible. The owner claims that there is a 3-foot lead at the bottom of the shaft, 10 inches of which is galena ore carrying high values in silver. This lead is probably the continuation of the *Indiana*.

Tulameen River District.

Mary Jenson. This claim is owned by Andy Jensen, of Tulameen, and is situated on the south-east side of Olivine mountain near Slate creek. Development-work consists of open-cuts, trenching, and stripping. General samples taken across the larger of the open-cuts gave as high as 2 per cent. copper, and picked samples up to 4 per cent. copper. The mineralization occurs in segregations in the olivine rock and is probably a primary constituent of these rocks. In the upper open-cut there is a strong copper-carbonate stain in the fractures of the olivine rock. Until more development-work has been done it is impossible to say whether these segregations are large enough to be worked profitably.

Kennedy Mountain.

This mountain is situated about twelve miles in a southerly direction from Princeton and about two miles in a south-westerly direction from Copper mountain across the Similkameen river.

There are several groups of claims on the summit and northern slope down to the Similkameen river, which are owned and have been developed to some extent by tunnels, open-cuts, and in one case diamond-drilling.

The names of some of the claims visited are as follows: *Bench Fraction*, *Fraser*, *Fraser Fraction*, *Hamilton*, *Don*, *Star*, *Bruce*, *Pearley*, *Apex*, *Ajax*, *Francis*, *Hamilton Fraction*, *Brooklyn Fraction*, and *Hamilton No. 3*, all of which are owned by the three McRae Bros., of Princeton. Other claims are the *Platinic*, *Yale*, *Fern*, *Glory*, and *Celtic*, owned by Hugh Kennedy, of Princeton, and the *Red Buck* group, owned by Allison P. Johnson *et al.*, of Princeton.

Geologically, these groups of claims will be dealt with collectively. The country-rock is a batholithic intrusion of igneous rock, generally a granodiorite, which has intruded and absorbed practically all the older sedimentaries, leaving only small remnants in the intrusive rocks. There are many dykes, some of which are diabase andesite and quartz porphyry, cutting the older formations and causing fracturing in an easterly and westerly direction.

Most of the ore occurrences on the north side of Kennedy mountain appear to be in zones of fracture in the igneous rocks, and those near the summit seem to be of contact origin in the sedimentaries. There also seems to be a considerable amount of mineralization in the country-rock, which is probably an original constituent of that rock. There is little doubt that the intrusion of the dykes, which caused a good deal of fracturing, is responsible for the deposition of most of the ore. The ores are mainly chalcopyrite, pyrite, bornite, and magnetite, and samples carried from 1 to 3 per cent. in copper and a small amount of gold.

Development.—On the first group of claims, owned by the McRae Bros. and situated on the north slope of Kennedy mountain from the Similkameen river up to an elevation of 950 feet, three tunnels have been driven into the mountain, two of which cut the granodiorite and show a slight mineralization disseminated through the rock. There is also evidence of copper carbonates wherever fracturing occurs.

The centre tunnel, approximately 300 feet above the river, is driven through 40 feet of fractured granite rock, which is well mineralized with chalcopyrite, pyrite, and some copper carbonates. Samples across this lead varied from 1 to 3 per cent. copper, with a small amount of gold. Other open-cuts showed copper carbonates in the fractures of the rock.

Farther to the west of the *McRae* group of claims, and adjoining, lie the *Red Buck* group, which have been developed by tunnels, open-cuts, and a little diamond-drilling. In the lower tunnel about 30 feet of ore lying in a crushed zone was cut. This ore contained chalcopyrite, pyrite, and copper carbonates, and samples ran from 4 to 8 per cent. in copper. No returns are to hand regarding the amount of ore found in the diamond-drill holes. The ore-bodies seem to have a general strike of S. 45° W. and a nearly perpendicular dip.

On the *Kennedy* group the work done amounts to surface-trenching and open-cuts and two short tunnels, approximately 25 feet long, driven in loose rock. There is some evidence of copper carbonates in the fractures of the monzonite, with occasional segregations of pyrite and chalcopyrite.

Both the *McRae* group and *Red Buck* groups have had enough work done upon them to warrant further development to ascertain the length of their respective ore-bodies and the possibility of finding others. A good wagon-road has been built from Princeton to a point directly above the claims, which should facilitate transportation.

BOUNDARY DISTRICT.

GREENWOOD MINING DIVISION.

REPORT BY W. R. DEWDNEY, GOLD COMMISSIONER.

I have the honour to submit the annual report on mining operations in the Greenwood Mining Division for the year 1919.

The *Providence* mine, near Greenwood, shipped to the Consolidated Mining, Smelting, and Power Company of Canada, Limited, 338 tons of ore containing: Gold, 267 oz.; silver, 38,903 oz.; lead, 7,616 lb. Gross value of all metals, $50,000. The number of men employed during the year has been increased from nine to twenty-eight. The property is leased to A. J. Morrison, of Greenwood.

Skylark and Silver Cloud.—Situated in Skylark camp. Leased to Duhamel & Bryant. Thirty tons of silver-gold ore was shipped from the *Skylark* to the Trail smelter during the year.

Crescent.—W. E. Thompson is operating this property and has shipped some ore to the smelter at Trail.

WALLACE MOUNTAIN, NEAR BEAVERDELL.

Bell.—Mine development: Drifting, 699 feet; raising, 65 feet. Claim development: New dining-hall, two dwellings, and bunk-house built and 2,600 feet of new road was constructed. Ore shipments and contents: 368 tons; gold, 8.647 oz.; silver, 45,844.8 oz.; lead, 24,489 lb.

Wellington.—Under lease and bond to James Sutherland and W. T. Thompson and owned by Ralph Smailes *et al.* The work done during the year consisted of 70 feet of drifting on the vein and some stoping. Twenty tons of very fine ore was extracted. Another promising lead has been uncovered. Two men employed.

Rob Roy Group.—Leased to Nordman & Sons and a Penticton syndicate. One hundred and six tons of ore was shipped to the Trail smelter in 1919. Twenty men employed.

Castor Fraction.—Thirty-five tons of ore was shipped from this mine. The lessees, Perry, Hambley & McKenzie, have been running a lift since July, 170 feet. They have tapped the lead, 1 foot wide and well mineralized. Two men employed.

Bounty.—Owned by S. M. Johnson and Stanhope. Three men are employed developing this property, which is considered to be a very promising one.

Carmi.—Situated at Carmi. H. H. Sawyer has been engaged during the year erecting a mill at this mine, but construction has been retarded on account of shortage of material and labour.

LIGHTNING PEAK CAMP.

Waterloo.—Owned by G. A. Rendell *et al.* Ten tons of ore was shipped from this mine in March, having an average assay of 528 oz. in silver and 5 per cent. lead to the ton. In the month of April 3 tons was shipped, the average assay being 293 oz. in silver and 4 per cent. lead to the ton. The owners built about five miles of road during the year. A new bunk-house and a stable were erected on the property.

Rampulo and Silver Lump.—Owned by T. Cortiana. Considerable work was done on the *Rampulo.* Drifting on the vein disclosed some fine ore.

Lightning Peak Group.—Ten tons of silver ore was shipped during the year.

Killarney.—A trial shipment was sent to the Trail smelter by the owner, W. J. Banting, of Edgewood.

Shipments of ore from this camp were curtailed to a great extent owing to the lack of proper transportation facilities, much difficulty being experienced in taking in supplies and shipping out the ore to Edgewood.

OFFICE STATISTICS—GREENWOOD MINING DIVISION.

Free miners' certificates	178
Locations (quartz)	71
Certificates of work	163

Bills of sale	18
Abandonments	1
Filings	22
Placer (rerecords)	3
Miscellaneous	3
Forfeited claims leased	4

GRAND FORKS MINING DIVISION.

Report by S. R. Almond, Gold Commissioner.

I have the honour to submit the annual report on mining in the Grand Forks Mining Division for the year 1919.

I would state that, as Philip B. Freeland, the Mining Engineer for District No. 4, which includes the Grand Forks Mining Division, is sending in a detailed report of the progress of mining in the Southern District, it would only be traversing the same ground, in a minor way, for me to furnish a report; however, I might remark that the main industry, the Granby smelter, was closed down during the season, and, in consequence, the mines at Phoenix closed. The *Emma* mine at Coltern was closed down for a period, but is again working; this mine, together with the *Rock Candy* mine and a few smaller shipping mines, now form the bulk of the industry in this Division.

Office Statistics—Grand Forks Mining Division.

Free miners' certificates	113
Locations	39
Certificates of work	109
Bills of sale, agreements, etc.	19
Filings	11
Certificates of improvements	14
Crown grants	15
Leases of reverted claims	6

OSOYOOS MINING DIVISION.

Report by J. R. Brown, Gold Commissioner, Fairview.

I have the honour to submit the annual report on mining operations in the Osoyoos Mining Division for the year 1919.

I regret that for the year there has been no improvement in mining matters; in fact, less has been done, both in prospecting and in development, than in the previous year.

Office Statistics—Osoyoos Mining Division.

Locations	61
Certificates of work	121
Conveyances	12
Leases of mineral claims	5
Free miners' certificates	59

CENTRAL DISTRICT (No. 3).

REPORT BY R. W. THOMSON, RESIDENT ENGINEER.

Central Mineral Survey District No. 3 comprises the seven Mining Divisions of Clinton, Lillooet, Kamloops, Ashcroft, Nicola, Vernon, and Yale.

In the 1918 Report an attempt was made to give a general idea of the geological history and structure of District No. 3 as taken from excerpts of reports on investigations made by officials of the Canadian Geological Survey extending over a period from 1877 to date.

During the year 1919 the Canadian Geological Survey had a party working in the Cadwallader Creek gold area completing investigations begun by the late C. W. Drysdale in 1915, also a party on topographical work in the area from Louis creek to Mount Olie, on the North Thompson river.

This district, although covering a large area, stands lowest of the six Mining Districts into which the Province is divided as regards mineral production.

Prospecting-work has been carried on in a vigorous manner over the whole of the district. The major portion of the time of the Resident Engineer has been occupied in making examinations of newly staked claims for the purpose of determining if there was justification for Government appropriations for trails. This work is very necessary and valuable from a general economic view-point, in that it frequently prevents the expenditure of a great deal of time and money on the exploitation of properties that have no possible chance of making good. The results of prospecting operations on the whole have been encouraging, and have added largely to the known mineral potentialities of the district. Perhaps the most important development to be noted in reviewing the year's work is that in connection with the limonite occurrences of the Taseko River vicinity, Clinton Mining Division, as investigated and reported on by Wm. M. Brewer, Resident Engineer of District No. 6. The potential importance of this field can scarcely be overestimated. The opening-up of these limonite-fields as an adjunct to the large magnetite occurrences known to exist should encourage the establishment of a steel industry in the Province in the near future. Mr. Brewer's report is published in full in the report on his District No. 6.

The results from the development-work being carried out by the Department of Mines in the Highland Valley copper area of Ashcroft Mining Division are very encouraging.

Reports of promising finds from the vicinity of the headwaters of the Clearwater and Thunder creek, in the Kamloops Mining Division, are coming in. This appears to be a silver-lead-copper belt.

The extension of the Pacific Great Eastern through the Clinton Mining Division will probably mean the opening-up of the hydromagnesite-deposits known to exist in this portion of the district. The completion of the Okanagan branch of the Canadian National Railways from Kamloops to Vernon via Grande Prairie, now under construction, should result in the exploitation of the gypsum-deposits situated about nine miles easterly from Grande Prairie. These deposits are reported to be of large extent and high quality and are situated within a mile of the location-line of the railway.

An industry that is becoming of considerable importance is that in connection with the utilization of the extensive natural magnesium-sulphate deposits in the Ashcroft and Clinton Mining Divisions. These latter will be mentioned under the heads of their respective Mining Divisions.

A large amount of Government-aided trail-work was carried out during the year, much to the benefit of those engaged in prospecting in new districts.

CLINTON MINING DIVISION.

The principal output from this Division during the year 1919 consisted of crude magnesium sulphate (Epsom salts) and a small amount of placer gold from Watson Bar creek. The prospects, however, are very promising for future development on a large scale, as indicated by the report of Wm. Brewer, Resident Engineer of District No. 6, on the iron-ore occurrences of

Basque Chemical Production Co.—No. 1 Lake, Epsom Salts.

Basque Chemical Production Co.—Storehouse.

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the Taseko (Whitewater) river and the report of L. Reinecke on the magnesite-deposits of the Division. Mr. Brewer's report will doubtless be given in full in another portion of the Annual Report.

Extracts from Mr. Reinecke's report* on the magnesite and clay occurrences are as follows:—

MAGNESITE.

"The composition of certain of these earths is given in the table below.† Analyses 4 and 5 illustrate the increase in calcium content with depth. I have been informed by F. Calvert, who tested the Meadow Lake deposit, that the change takes place rather abruptly at a depth of 2 feet in the Meadow Lake deposit. This is true in general of the deposit at Watson lake. The silica content also increases with depth.

"*Amounts available.*—In general it may be said that the purer hydromagnesites are flat deposits outcropping on low ground. The upper 1½ to 2½ feet is, in general, of high grade, but from that depth down the siliceous and lime content is too high for commercial exploitation. The only known exception is one of the outcrops at Watson lake which is believed to be of good quality to a depth of 5 feet. Dr. K. A. Clark, of the Mines Branch, determined the 'apparent specific gravity' of lumps of this material as they were dug from the deposit at Watson lake as 1.22. This makes the weight of a cubic yard of the hydromagnesite as it lies in the deposit, including voids, 2,050 lb. Tonnage was calculated from this factor on the supposition that only the material outcropping was of commercial value, and from such scanty data as to depth as were available. Figured on this basis, there is about 7,000 tons of high-grade material at Clinton, 25,000 tons at Watson lake, and 180,000 tons at Meadow lake. Besides the better-grade hydromagnesite, there are large quantities of impure material in all three places."

A hydromagnesite-deposit near 105-Mile House, Cariboo road, is referred to in the 1918 Annual Report, page 228; also note by Provincial Mineralogist on page 243 of same publication.

CLAY.

The following extract is from that portion of the above-mentioned report appearing in the August bulletin of the Canadian Mining Institute, page 874:—

"This district is one of the few in Canada in which occurrences of residual clay has been found. There is a great dearth of workable deposits of kaolin and high-grade fireclay in Canada, and as kaolins are to be looked for in such residual deposits, a special effort was made to examine and sample as many outcrops of residual clay as possible. . . . Only one residual clay was of high grade. This occurs in an outcrop of argillites and quartzites of the Cache Creek series west of Fraser river at Chimney Creek bridge. Robert Gardner, of Riske Creek, holds it under a quarry lease. The results of the laboratory tests on clay from this bank may be summarized as follows: The beds tested are numbered from top to bottom.‡ It will be noticed that 27 feet out of the 55-foot section can be considered fireclay—that is, using above cone 26—and of that 2 to 3 feet is highly refractory. It would be difficult to quarry without including the other less refractory beds. According to Keele, 'these clays as a whole might be worked for the manufacture of low-grade firebrick or mixed with more plastic clay for making sewer-pipe. Crushed and washed they would yield some fine-grained clay for the manufacture of stoneware goods, but the yield of washed clay would probably be too small to repay that operation.' The clays lie fifteen miles by road over a stiff grade from the railway at Williams lake, and the nearest water for washing purposes is 1,500 feet or so below, in Fraser river. They cannot be looked on as a commercial proposition, but the finding of fireclay here should encourage prospecting close to the railway-line farther up the river."

MAGNESIUM SULPHATE (EPSOM SALTS) LAKE.

Situated a mile and a half south of Clinton. Extraction of the salt-crust from this lake was carried on to a considerable extent during the winter of 1918-19. Two grades were taken out and stored on the shores of the lake—No. 1 grade, the purer, upper crust, and the No. 2 grade, which underlies No. 1 and is more or less mixed with muddy impurities. No. 1 is sufficiently pure to be classed as technical salts to be used in the arts and manufactures. No. 2 requires

* Undeveloped Mineral Resources of the Clinton District, B.C., by L. Reinecke.
† Table omitted.
‡ Tests omitted.

refining. During the early part of the present year fifteen cars of No. 2 were shipped from Clinton to the Oroville refinery of the Stewart-Calvert Company, the owners of the deposit.

Little was done during the latter part of the year. Shipping, however, has been resumed since the beginning of the year 1920.

Scottie Creek Chrome-iron Mine.

No work has been done during 1919.

Watson Bar Creek Placer.

The Gold Commissioner, Clinton, estimates recovery for 1919 at about 270 oz. of gold.

Taseko (Whitewater) River iron-ore deposits. (*See* report by Wm. M. Brewer, Resident Engineer of Mineral Survey District No. 6.)

Mad Major and *Copper King* groups of mineral claims. (*See* report by Wm. M. Brewer, Resident Engineer of Mineral Survey District No. 6.)

LILLOOET MINING DIVISION.

Cadwallader Creek Area.

This camp was visited on October 18th and 19th. The only property operating underground work and reduction plant at that time was the *Lorne* mine.

During the summer the Geological Survey of Canada had a party in the neighbourhood completing the geological survey of the district begun by C. W. Drysdale in 1915.

Pioneer.—This property was worked under normal conditions until the latter part of the year, when operations were suspended pending the result of reconstruction proceedings, an Eastern mining company having taken an option to purchase the *Pioneer* holdings.

Lorne.—Operations were carried on continuously during the year with a small crew, attention being directed chiefly to development-work. About 400 tons of rock was milled. The development as carried out on the several veins worked is of a promising nature.

Ida May.—This property was operated with a small force of men for a short time during the summer and a limited tonnage of rock treated with the plant described in last year's Report.

Wayside.—The main tunnel has been driven to a length of over 900 feet and a crosscut a short distance back from the face has been run for a distance of something over 30 feet. No developments of particular interest have been reported.

Coronation.—Nothing has been done on this property for the past three years. Assessment-work has been carried out on a large number of properties in this area which are at present of minor importance.

Copper Mountain.—Situated on Gun creek. Assessment-work and trail-construction have been carried out on this property. No developments of special interest have been reported. A good trail has been completed from the Bridge River wagon-road up Gun creek to the mine. This trail has been found very convenient in giving access for a portion of the trip into the Taseko River iron-ore deposit.

Tenquille Creek Area.

Assessment-work has been prosecuted in this camp during the year. The trail running from Mile 71 on the Pacific Great Eastern to the centre of the mining activity has been completed, giving easy access to the camp. This will have considerable effect in stimulating interest in the district, the old trail up the Lillooet river being very difficult and trying as a route for getting in supplies.

KAMLOOPS MINING DIVISION.

This might be termed the Copper Division of District No. 3, as up to date this forms the principal metalliferous product not only of this Mining Division, but of the whole district, and is practically all produced by one mine. Prospecting and development operations in the vicinity of the North Thompson river, however, point to possibilities of a future in silver-lead operations, also lode gold in the vicinity of Dunn lake and coal about fifty miles up the North Thompson river from Kamloops.

Iron Mask.—This property was discussed in last year's Annual Report. During the past year the mine has been working steadily with a force of about fifty men employed. Shipments

of copper concentrates to the Trail smelter have been going on throughout the year. The management remains the same as during the past three years.

Lydia Group.—(*See* 1918 Report.) Work has been suspended on this property, the option under which work was being carried out during 1918-19 having been allowed to lapse.

Queen Bess.—(*See* 1918 Report.) The new mill was operated for a short time during the early part of 1919, when it was thought advisable by the management to confine attention to development only. Twenty-six tons of silver-lead concentrates was shipped during the year, leaving approximately 75 tons of zinc concentrates at the mine awaiting favourable terms for marketing. The development-work carried out during the year has much improved the prospects of the mine, milling operations having resumed during the early months of 1920.

Copper King and Camp McLeod Groups.—The option held by the Granby Company on these properties has been dropped. The trail, however, leading to this promising field (*see* report by Wm. M. Brewer in Report of Minister of Mines, 1913, page 203) from the head of Seymour arm was completed during the year.

Tenderfoot.—(*See* report by Wm. M. Brewer, Minister of Mines' Report, 1913, page 196.) This property has been idle during the greater part of the year. An option held by Eastern financiers has been renewed, one of the conditions of which is that machinery for a concentrating plant is to be on the property by the middle of June, 1920.

War Colt Group.—Situated near the headwaters of the Clearwater river and Thunder creek, in the extreme northerly portion of the Division. Staked by Adolph Anderson, of Swift Creek, and Lewis Knutson, of Tete Jaune Cache. The samples of ore from this vicinity consist of a complex of galena, chalcopyrite, and sphalerite. An Edmonton syndicate has secured an option on the claims and has constructed a trail from the Canadian National Railway to the camp, a distance of approximately forty miles.

Gold Hill and Keystone.—On the north side of Dunn creek, in the vicinity of the *Windpass* group (described in 1917 Annual Report), is a group of claims owned by Fennell & Skoning, of Chu Chua. Mr. Skoning has been working on these claims for the past three years and has opened up several leads on the surface, besides doing a considerable amount of tunnelling. I have not had an opportunity to examine these claims since 1917, but it is reported that "visible" gold occurs in places and that average values are encouraging.

Coal.

In the Annual Report of the Geological Survey of Canada, Vol. VII., 1894, pages 228-231B, there is a report by G. M. Dawson on the coal area situated about fifty miles up the North Thompson river from Kamloops, in the vicinity of Newhykulston (Coal) creek.

In Dawson's report the coal is stated to be of excellent quality, but that the seams as exposed appeared to be too narrow to be successfully worked as a commercial proposition, although it is stated that if development-work showed increased widths in the seams the field might become of considerable importance. Recent investigations along the banks of Newhykulston creek have shown the existence of coal-seams of workable thickness. During the latter part of 1919 a syndicate composed principally of parties interested in the Queen Bess Mines, Inc., took a working option from the original leaseholders of the ground and have been shipping to the Queen Bess Mines since the beginning of 1920. Eight car-loads had been shipped at the end of February. The coal is used for supplying power for underground and mill operation and is said to give the best of satisfaction as a fuel. Work has been carried out so far on one seam only, which at 200 feet from the tunnel portal is said to give 42 inches of clean coal. It is the intention to develop other seams and also to test the ground by drilling.

Gypsum.

In the Annual Report of the Minister of Mines, 1913, on page 205, there is a report by Wm. M. Brewer on the gypsum occurrences situated on Bolean creek, a tributary of the Salmon river. These lie about eight miles easterly from the post-office at Grande Prairie.

Mr. Brewer states that this can be traced along a distance of a mile and a quarter and that in some places it reaches a maximum thickness of 300 feet between walls. A typical sample taken by Mr. Brewer showed this deposit to consist of practically pure gypsum.

Dr. Dawson in a preliminary report in 1889 says: "Gypsum . . . has since been discovered, and, according to the accounts received, in large quantity. The locality is stated

to be on the Salmon river about twenty miles distant from the railway. From the excellent quality of the specimens which I have seen, this discovery may prove to be of importance."

In 1895 James McEvoy reported as follows: "On the hillside north of the middle crossing of Salmon river there is a fine deposit of gypsum, associated with grey schists and white crystalline limestone. The principal deposit, in which a tunnel 25 feet long has been made, is 100 feet and over in thickness. The exact thickness could not be ascertained on account of the heavy covering of drift on the hillside. Above this is another deposit with a thickness of 30 feet or more; still higher up are two more small deposits, one of which shows bedding. The large deposit is massive and perfectly white in some places, showing slight traces of anhydrite. The general strike of the deposits is true east and west, with vertical or high northerly dip."

Dr. Dawson's inference as developed in the reports of Mr. McEvoy and Mr. Brewer will probably be verified at an early date, as there is no doubt that steps will be taken to make this an active commercial proposition as soon as the railway now under construction, and which passes within a mile of the property, is completed.

ASHCROFT MINING DIVISION.

The only developments of importance that have taken place during the year in this Division are those in connection with the operations of the Basque Chemical Production Company, Limited, working the magnesium sulphate or Epsom salts deposits near Basque, on the Canadian National Railway, and the development by the Government, under the provisions of "Mineral Survey and Development Act," of the claims known as the *Snowstorm* group in Highland valley. The former can now be said to be established on a permanent basis and promises to develop into an industry of considerable magnitude and importance; the latter, although still in the initial stages of development, is sufficiently encouraging to warrant considerable further work being done in the way of proving up the size and value of the ore body or bodies in the vicinity.

BASQUE CHEMICAL PRODUCTION COMPANY, LIMITED.

(*See* 1918 Annual Report.) This property changed control during the past year, having been taken over by Eastern financiers. Head office, 509 Richards street, Vancouver; Jesse G. Miller, manager. The operations of the company during the year and the prospects for the future are best described by extracts from a report by Mr. Miller, the manager, under date of January 31st, 1920, and are as follows:—

"We started actual work in the production and manufacture of Epsom salts on July 14th, 1919, and up to the end of December we have shipped five car-loads of salts, 138 tons in all; 120 tons of this amount was shipped to large tanners in Ontario for their purposes; also 6 tons of medicinal Epsom salts for human use went to Ontario and 12 tons of the medicinal salts was distributed in Vancouver.

"Our salt is practically 100 per cent. pure Epsom salt as we take it out of the lakes; the enclosed analysis is that of the last car we shipped to Ontario and is approximately the same as all previous shipments.

"We have been operating with an average force of ten men for the six months ending December 31st, 1919.

"We are practically still in an experimental stage and our present plant and equipment which we installed has a capacity of two to three car-loads per month, but the extreme cold weather we have experienced during the past two months has prevented us making this average. However, we expect to overcome all difficulties, and as time goes by we hope to increase the output and naturally increase the number of employees.

"We will now begin experimental work with a crystallizing plant in a small way in order to determine which will be the cheapest method of manufacturing the salts on a large scale.

"Samples of our product have been submitted to large dealers in the United States, United Kingdom ports of call, the Orient, and Far East.

"We have been informed that Canada imports approximately $2,000,000 to $2,500,000 worth of magnesium sulphate each year. It is our ambition to even the balance of trade on this commodity, and we believe we should have no difficulty in doing so, especially because of the high grade of purity of our product.

"One of the largest tanners under the British flag is using our Epsom salts in car-load lots, and we have been advised that they obtain better results in the tanning of leather with our salts. All who have purchased our medicinal salts have expressed themselves as highly pleased.

"We are handicapped because of the high freight rates to the East and are seeking a reduction. The rate we are obliged to pay at present is 94 cents a 100 lb., or $18.80 a ton. The American manufacturers can ship Epsom salts into Canada and pay the duty and war-tax, even with the high rate of exchange, at a much lower cost than we can, because their rate is only about $3.50. We are experiencing the same difficulty with the ocean freight rates to London, Liverpool, and Glasgow, which are $35 and $40 a ton. This makes it prohibitive to do business in the British Empire. The British firms would give us the preference, but we cannot compete with the European market on account of the high freight rates prevailing at the present time. We are making every effort to get lower rates, which will be absolutely necessary before we can do business abroad.

"With our unlimited quantities of pure Epsom salts we feel assured that we will develop a large industry of Canada."

Analysis of salts shipped in car referred to in paragraph 2 of report above:—

"*Messrs. Basque Chemical Production Co., Ltd.,*
North West Building, Vancouver, B.C.

"Gentlemen,—We have analysed the sample of magnesium sulphate submitted by you, and report the following results:—

	Per Cent.
Insoluble matter	0.02
Lead	None.
Arsenic	None.
Zinc	None.
Iron	None.
Lime (CaO)	None.
Chlorides	Slight trace.
Loss on ignition (as moisture)	50.74
Magnesia (MgO)	16.20
Sulphuric anhydride (SO_3)	33.02
Sodium (Na_2O)	0.02
	100.00

"The above results show that this material will pass the B.P. and U.S.P. specifications.

"Yours faithfully,
"G. S. Eldridge & Co.
"Per Norman Armstrong."

Snowstorm Group.

(*See* Report of Minister of Mines, 1917.) Recently this group of claims has been surveyed, the survey showing a compact block of twenty-two claims and fractions. For convenience in discussing the development accomplished on these claims during the past year, the work will be described under two heads, the *Snowstorm* sub-group and the *Iona* sub-group.

Snowstorm Sub-group.

Diamond-drilling operations were started on the *Snowstorm* claim about the middle of January, 1919, by the Department of Mines under the provisions of the "Mineral Survey and Development Act," the work being done on contract by the International Diamond Drill Contracting Company, of Spokane, Wash., using a drill cutting a ⅞-inch core. As the mass of data secured in the way of geological sections, assay plans of cores and sludge, etc., is too bulky to publish in this report and would be of little value without an accompanying survey plan which is not yet to hand, a condensed general descriptive report only can be given.

Work was carried on continuously throughout the summer, eight holes being put down, varying in dips between 30 and 63 degrees and in lengths between 400 feet and 1,125 feet, aggregating a total length of 5,736 feet. In the holes put down three distinct types of rocks

were encountered. Specimens of these were submitted to John A. Dresser, mining geologist, of Montreal, for classification, which is as follows:—

Specimen submitted.	Dr. Dresser's Classification.
No. 1. Country-rock of the locality.....	Granodiorite, approaching quartz diorite in composition.
No. 2. Porphyritic rock	Hornblende porphyry, approaching hornblende porphyrite in composition.
No. 3. Ore-bearing rock; has the appearance of a much-altered basaltic rock	Judging from a single specimen of each, this rock would appear to have been originally similar to No. 2, but is now much altered, perhaps near an intrusive contact.

Neither No. 2 nor No. 3 are exposed to any extent on the surface, but the boreholes show both to be of considerable extent, both laterally and vertically, below the surface of the country granodiorite. No. 3 occurs as an extrusive or injected rock in association with the granodiorite, having well-defined contacts, but the boreholes do not show it in any case as being in contact with the porphyry.

In starting operations the only surface conditions to influence the location of No. 1 borehole was the position of the workings from which shipments had been made as published in previous reports on this property: this is a fissure or fracture striking in a north-east south-west direction which carried high-grade bornite and chalcopyrite. Hole No. 1 was put down at an angle of 30 degrees to crosscut this fissure at a point about 100 feet below the workings, or 150 feet below the surface. No positive results were secured from No. 1 hole. No. 2 was drilled from the same position at an angle of 63 degrees to see if the fissure may not have pinched and then swelled at a greater depth, but this did not appear to be the case.

In the old workings a cross-fissure carrying low-grade ore was observed, and it was decided to drill along the general direction of the fissuring of the country-rock, which, as mentioned before, is in a north-east south-west direction. Two holes, No. 3 and No. 4, were put down in this general direction with very encouraging results, the mineral-bearing rock being passed through in both. In No. 4, which was put down at a dip of 45 degrees, 93 feet of the mineralized altered basaltic rock and 67 feet of the granodiorite were passed through between the distances 355 and 515 feet on the borehole, the granodiorite occurring in four separate tongues interbedded in the ore-bearing rock. The drill-hole No. 4 probably passed through the ore-bodies at a small angle with the direction of their strike, thus accounting for the long lengths of ore encountered in the drill-holes. Hole No. 6 was put down at a dip of 57 degrees to crosscut the ore-bodies shown in No. 4, and at a vertical depth of 600 feet passed through 33 feet (along the direction of the drill-hole) of the ore-bearing rock. No. 7 verified conditions to be similar to No. 6 about 600 feet north-easterly from same, mineral being passed through at a vertical depth of over 800 feet. No. 8, the last hole put down, was for the purpose of prospecting the country to the south-east of the line on which the preceding work had been done. It was put down on a dip of 45 degrees, crosscutting the general direction of fracturing of the country-rock and the ground adjacent to that on which the previous work had been done. The following is a condensed log of the results secured from hole No. 8:—

Distance along Borehole.	Average Vertical Depth.	Width of Ore-body along Line of Borehole.	Length of Core recovered.	Average Assay Value of Core (Copper).
Feet.	Feet.	Feet.	Feet.	Per Cent.
199-207	142	8	3	2.70
239-241	168	2	2	2.67
396-400	280	4	2	2.40
472-476	330	4	4	1.00
503-521	360	18	10	1.80

The hole was continued to a length of 939 feet without encountering further ore-bodies, and it was the intention to carry on until the zone crosscut by Nos. 6 and 7 had been reached, but

at the depth of 939 feet caving ground prevented further progress with this borehole. With detailed survey plans, geological and assay sections, it will then be possible to give an accurate idea of the work as carried out, but it is hoped the above descriptive report may give a general idea of the work accomplished and the nature of the country being prospected. The results so far secured by diamond-drilling, indicating as it does the existence of ore-bodies of commercial value extending over large areas and to considerable depths, should justify the undertaking of active development-work by the ordinary methods.

Iona Sub-group. Situated about three-quarters of a mile south-westerly from the *Snowstorm* sub-group. In the 1917 Report of the Minister of Mines the *Iona* occurrence is described as being mineralized ground showing on the surface over an area at least 60 feet in diameter and from which a sample gave 1.3 per cent. copper. During the summer efforts were directed towards determining the boundaries of the mineralized zone exposed on the *Iona* claim by surface open-cuts, and these show the zone to be at least 200 feet in width. After the drilling on the *Snowstorm* sub-group had been completed an attempt was made to prospect the *Iona* group by diamond-drilling, but the rock formation near the surface was found to be so badly fractured that difficulty was encountered in operating the drill in such broken ground, and it was decided necessary to open-cut or tunnel until the more unbroken formation was reached, which would permit of the diamond-drill work being continued. On the approach of snow surface work had to be discarded, and efforts were made to reach the solid formation by a tunnel, started in a north-westerly direction to cross-cut the ore-bearing zone.

At the end of March, 1920, this tunnel had been driven 225 feet, but had not then struck formation sufficiently unbroken to permit of diamond-drilling being restarted. The whole of this tunnel is in the ore-bearing zone and shows it to be an occurrence quite distinct from the country granodiorite.

Samples from the surface submitted to Dr. J. A. Dresser, of Montreal, were classified by him as "quartz-carbonate" rocks. The ore-body as shown in the tunnel is very much fractured and broken and impregnated with the green carbonate of copper on the fracture faces; streaks of bornite also occur and small cavities lined with copper carbonate which in some cases carry residual bornite. Apparently there has been considerable leaching action. Judging from description, this ore very much resembles the Ajo (Arizona) monzonite-porphyry copper occurrences, which are being worked by the leaching system of extraction with commercially successful results. Chip samples taken along the tunnel-walls indicate large bodies of ore averaging over 1 per cent. copper. The maximum depth of the tunnel below the surface at its deepest point is 70 feet, which is still in the oxidized zone. The sulphide zone which should underlie the oxidized zone in this occurrence has not yet been investigated. The work so far done has shown that there is a very large body of mineralized monzonitic rock in this locality, but sufficient data has not yet been secured to warrant estimating quantities or ultimate average values.

Further work will be carried out on the properties, which, it is expected, will not be finished within the next year at least.

O.K. Mine, Highland Valley.

Work on this property was resumed with a small crew of men during the latter part of the year. A raise has been put up and sinking on a winze is now in progress. A considerable amount of ore is said to have been opened up in the recent development-work, but milling operations have not yet restarted.

Diatomaceous Earth.

Situated about twenty-five miles up Deadman creek from the Thompson river is a large deposit of a material that has been designated by the Mines Branch, Ottawa, as a "diatomaceous earth." The Milton-Hersey Company, Limited, of Montreal, in a report giving the analysis, etc., of a sample submitted by the owners, make the following statement: "This is an extremely fine siliceous rock. On a microscopic examination more than 75 per cent. of the particles are from one ten-thousandth to five ten-thousandths inch in diameter. Few pieces show a maximum of fifteen ten-thousandths; that is, practically all the material when crushed would pass through a 200-mesh sieve. This material would make a very good filler for soap and paint."

NICOLA MINING DIVISION.

The important output from this Division is coal. The Middlesboro Collieries, Limited, and the Fleming Coal Company have been operating steadily throughout the year.

STUMP LAKE AREA.

Stimulated no doubt by the rather abnormal price of silver, there has been increased interest taken in this camp during the past year.

Donohoe. Operations were resumed on this property during the summer, a crew of about twelve men being employed during the latter half of the year. The workings at the *Joshua* shaft were unwatered to below the 400-foot level and the mine put in shape for proper working. A compressor and air-drills were installed for working the mine. Shipments of the high-grade silver ore have been started since the beginning of 1920, and arrangements are under way for the installation of an up-to-date concentrating plant.

Mary Reynolds. R. R. Hedley has been carrying on operations on this property. During the year considerable development-work was done and a road built to connect the mine with the Nicola-Kamloops highway. During the early part of the year 1919 about 130 tons of ore was shipped. The latter part of the year was devoted largely to prospecting-work in the locality. Several new and promising veins are reported to have been discovered.

ASPEN GROVE.

During the autumn of 1918 options were taken on a large number of claims in this camp by a very strong financial group which later transferred an interest to New York operators. Investigations of geological conditions were carried on during the summer of 1919, and in the autumn of the same year it was decided to start drilling operations. These are now in progress. No other developments of importance are reported for this locality.

VERNON MINING DIVISION.

Several examinations of prospects were made in this Division during the year, but the only one examined deserving of mention is the property known as the *Black Hawk*.

Black Hawk. Situated near the head of Irish creek, about sixteen miles northerly from Vernon; owner, A. J. McMullen, of Vernon. Considerable work has been done on this property. One tunnel 240 feet in length, with branch tunnel 40 feet in length, has been driven in country-rock; also another tunnel 100 feet in length, with a branch tunnel 50 feet. Both of these were driven with the idea of tapping a vein which traverses the property, but from which no results ensued. There is a quartz vein traversing the property which shows on the surface in occasional outcroppings over a considerable distance. The country-rock is of a basaltic nature. Surface samples taken in the vicinity of the workings along a distance of approximately 150 feet gave the following results:—

(1.) Near south-east end of workings, across 3 feet 6 inches: Gold 0.56 oz. and silver 0.20 oz. to the ton.

(2.) About 75 feet north-west from No. 1, across 6 feet: Gold 0.56 oz. and silver 0.20 oz. to the ton.

(3.) Across 5 feet in shallow incline north-west from No. 2: Gold 0.20 oz. and silver 1.50 oz. to the ton.

This property is situated less than half a mile from the location-line of the Okanagan branch of the Canadian National Railway and should be deserving of further investigation.

This Mining Division is more important at the present time as an agricultural than as a mining district, but there are possibilities in the latter.

YALE MINING DIVISION.

Emancipation Mining Co., Ltd.—Work has been continued on this property throughout the year. A small gasolene-hoist has been installed in the mine for the purpose of facilitating hoisting operations underground. About 8 tons of ore was shipped during the year, the value of which is estimated at $350 a ton in gold.

River Gold Recovery Co.—Operating last year on a lease situated about half a mile below Hope. Operations closed last autumn. The plant has been removed.

LADNER CREEK.

A trip was made up Ladner Creek valley in the month of June for the purpose of investigating as to whether conditions warranted the construction of a trail to facilitate prospecting operations in this vicinity. The examination was necessarily of a very casual nature.

Snowstorm Group, Iona Claim.

Snowstorm M.C.—Diamond-drilled.

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Ladner creek runs south-easterly to the Coquihalla river, which it joins about sixteen miles above Hope. This creek traverses a series of argillites which are generally ascribed as belonging to the Cache Creek formation. This argillite-belt appears to be of considerable width and extends north-westerly to Siwash creek, on which the *Emigrant* mine is situated. The *Emancipation* mine on the north slope of the Coquihalla valley is also situated in this same belt. Numerous occurrences of quartz, either of lenticular or vein conformation, are present throughout this whole argillitic formation, and a number carry gold values of commercial importance. Only two samples were taken, and these were from the *Idaho* claim, owned by Palmer & Bailey. Pannings were made from O'Connell's and other claims which showed good gold values. The assay results from the *Idaho* samples were as follows:—

(1.) Across 4 feet on hanging-wall side of vein (vein 23 feet width): Gold 0.44 oz. and silver 0.06 oz. to the ton.

(2.) Across 5 feet near centre of ore-body, which is exposed for width of 20 feet with walls not yet uncovered, and 150 feet north-west from No. 1 on same vein: Gold 0.16 oz. and silver 0.04 oz. to the ton.

This area is deserving of further investigation.

LILLOOET DISTRICT.

LILLOOET MINING DIVISION.

REPORT BY JOHN DUNLOP, GOLD COMMISSIONER.

I have the honour to submit the annual report on the progress of mining in Lillooet Mining Division during the year 1919.

MINERAL CLAIMS.

Cadwallader creek being the important section in so far as mining operations are carried on the year round, the recovery of bullion has fallen short of other years. The cause may undoubtedly be attributed to labour and other untoward circumstances.

Pioneer.—For some seasons past this camp has been highly successful and the ore milled on the premises gave good returns to the owners. In the latter part of the year operations ceased, the mine being virtually closed down for some time. Pending negotiations anent a deal on the property, the owners did not resume operations and granted an option to purchase to an Eastern mining company. Work has been again commenced under new management.

Lorne.—This property treated about 400 tons of ore during the early part of the season that had been mined in the winter of 1918, the gross value of which yielded in gold bullion $2,565.55. No further milling of ore was made and development-work thereafter was carried on steadily with a small crew.

Ida May.—Work of a prospecting character was conducted with a small force, and I understand that an important discovery of valuable ore was disclosed late in the season.

Wayside.—The owner is persevering and diligently confines attention to the extension of tunnel-work and crosscutting.

Coronation.—This property has been idle for the past three years.

Very little development was done on the mineral claims in the Copper Mountain section. It is essential and to the interest of the locators and others that the trail, commencing at a point at Bridge river and leading up Gun creek, a distance of about thirty miles, be completed, so that the requisite materials and mining supplies may be brought on the ground at a reasonable figure. I understand that considerable work in this direction was done during the past year and the owners of claims devoted the best part of the season thereto, such work being in direct relation and in direct proximity to their recorded interests. I am also informed that the *Copper Mountain* mineral group is under option to a mining syndicate, and it is the intention to open up a camp as soon as weather permits.

Index Group.—This group is situated on Texas creek, a tributary of the Fraser river. The company owning the property had a force of men employed building a narrow road to the mine via Cayoosh creek; while considerable work was done, there is much yet to accomplish, as the country is steep and rugged.

Anderson Lake Mining & Milling Co.—Situated on McGillivray creek at Anderson lake. Beyond performing the necessary assessment-work on the two mineral claims, no mining or milling of ore has been done. This property has been idle for a number of years past.

The usual annual assessment-work as required under the "Mineral Act" on the mineral claims in and around Tenquille creek and Pemberton Meadows had the attention of the owners. There is nothing special to report.

PLACER CLAIMS.

The mining leases, with one exception, were dormant and idle. The recovery of gold along the creek-beds and rivers by the individual miner during the season is $1,590; a little increase over 1918.

OFFICE STATISTICS—LILLOOET MINING DIVISION.

Free miners' certificates issued	208
Mineral claims recorded	244
Certificates of work recorded	297

Placer claims recorded and rerecorded	11
Mining leases in force	37
Transfers and agreements recorded	76

Revenue.

Free miners' certificates	$ 942 00
Mining receipts, general	2,402 35
Tax, Crown-granted mineral claims	613 52
Total	$3,957 87

CLINTON MINING DIVISION.

Report by G. Milburn, Gold Commissioner.

I have the honour to submit the annual report of the Clinton Mining Division of Lillooet District for the year ending December 31st, 1919.

Almost as great activity in locating of claims prevailed this year as last, a total of 270 mineral claims having been recorded and twenty-five placer claims, inclusive of eleven which were rerecords.

Mineral claims were recorded in nearly every locality in the Division. A lake containing a form of salts was staked early in January and may develop into a shipping mine of the same nature as the Epsom salts claims now in the hands of the Stewart-Calvert Company, Inc., of Oroville, Wash.

A block of twelve claims in the immediate vicinity of Clinton was also staked during January, but I have no information as to what mineral was found on this ground. Within the area staked, however, is a block of porous, honeycombed, sedimentary lime-deposit which is reported to be very pure, and, as it is intersected by the Pacific Great Eastern Railway, it is advantageously placed for shipping.

In the northern portion of the district, in the vicinity of the Pacific Great Eastern Railway where it parallels the Cariboo road near the 141-Mile House, a block of ninety-four mineral claims were staked and recorded in the early part of the year. This ground, I understand, was located for hydromagnesite, but I do not know the results of the analysis of the various samples taken.

Towards the south-western extremity of the Division a group of mineral claims now known as the *Mad Major* group was staked towards the end of last year, and this year assessment-work was recorded and further claims were recorded, thus enlarging the property. In the same portion of the Division a block of fifty-three claims was recorded on the west slope of Iron mountain, situated in the Taseko country. These iron claims are in a portion of the country away from the regular means of transportation and development would appear to be contingent upon projection of a railroad to the claims.

In addition to the claims already mentioned, several soda-lakes scattered through the northern part of the district have been staked and the contents tested.

A greater amount of assessment-work than ever before in the experience of my office was recorded during the year, the number of certificates issued being 120, as compared with twenty-seven in the previous year. Certificates of work were issued in connection with a large number of the claims referred to in my report of last year as a nickel proposition, the work done consisting largely of test-bores made with a drill brought in for the purpose. I have no information regarding results.

Further development-work was prosecuted by C. E. Cartwright on his magnesite claims east of the town of Clinton and several tunnels were driven, the greatest depth being 150 feet. This work was performed in the early part of the year, since when no further work has been done.

The Stewart-Calvert Company, Inc., has been shipping magnesium-sulphate salts from the lake situated about one mile south of Clinton, and in the past twelve months has sent out in the neighbourhood of twenty car-loads. The salts have not been refined and the only process they have gone through before shipment has been that of grinding. A considerable tonnage

collected during the winter of 1918-19 still remains and no further work collecting from the lake has been done.

The soda claims at the 70-Mile House have not been worked during the past year. This is also true of the Scottie Creek claims, where a considerable tonnage of chrome iron awaits a favourable market before being shipped. Pending the outcome of litigation, the hydromagnesite claims at Meadow lake have not developed into shipping mines, but, as the deposit is apparently exceptionally pure and valuable, developments should take place in the near future.

PLACER-MINING.

The outlook for placer-mining in this Division has been much brighter, but it would appear that until dredging on a large scale in the Fraser river is seriously taken up this form of mining will not amount to very much.

Several individual placer-mining claims on Watson Bar creek have been worked and upwards of $5,000 worth of gold has been recovered. One creek lease on the North fork of Watson Bar creek was granted, and the lessee immediately proceeded with development-work necessary to making it a producer. Upwards of $1,500 worth of preparatory work was done, and it is hoped that some of the precious metal will be recovered next season.

One dredging lease was cancelled and one granted. This latter was for one mile of the bed of the Fraser river, which it was the intention of the lessee to prospect by means of a diver's outfit. I have had no report of the outcome of this unusual method.

OFFICE STATISTICS—CLINTON MINING DIVISION.

Free miners' certificates	125
Free miners' certificates (special)	2
Mineral claims	270
Certificates of work	120
Placer claims recorded and rerecorded	27
Bills of sale, etc.	79
Dredging leases in force	14
Creek leases in force	1

Revenue.

Free miners' certificates	$ 605 75
Mining receipts, general	1,561 60
Total	$2,167 35

YALE DISTRICT.

NICOLA MINING DIVISION.

REPORT BY J. A. MURCHISON, MINING RECORDER.

I have the honour to submit herewith the annual report and office statistics of the Nicola Mining Division for the year ending December 31st, 1919.

Development-work on silver and copper properties has been vigorously prosecuted, and with satisfactory results, though progress has been retarded by unsettled labour conditions and the excessive cost of mining supplies.

ASPEN GROVE (COPPER).

Aspen Grove Amalgamated Mines, Ltd.—A good camp has been established and good progress has been made with one diamond-drill since about the middle of December. Another drill is to be put in operation shortly, and should drilling results continue satisfactory extensive operations may be anticipated. The option-holders of this property are experienced mining men of good financial ability.

STUMP LAKE (SILVER).

Donohoe. The group of properties known as the *Donohoe* mines comprise eight Crown-granted mineral claims located on Mineral hill, in the Stump Lake district. Over $200,000 has been expended in development-work, and during the current year work has been confined exclusively to reclaiming the ore-bodies in the lower levels of the *Joshua* mine and in the installation of modern mining machinery. This property is being developed by practical mining men and work is progressing with encouraging results. Regular shipments of silver ore are now being made to the Trail smelter, but smelting results are not yet known.

Mary Reynolds Group. Development-work on this silver property at Stump lake during the year consists of 74 feet of drift from the shaft and 140 feet of tunnel, with 30 feet of raise and 60 feet of open-cut approach. As a result of recent prospecting a new vein has been uncovered paralleling the old vein 150 feet to the west. This vein, where exposed, is over 8 feet wide, is thoroughly oxidized and leached, and carries low values in silver. Outcrops have been traced about 500 feet north and 800 feet south. Work has also been done on outlying claims located as extensions and a mountain wagon-road has been built from Rockford to the mine.

With this group is the *Robert Dunsmuir* Crown-granted claim, lying about 750 feet west of the *Mary Reynolds*, on which a strong outcrop has been traced and two claims located.

Recent locations were the *Elkhorn* group of four claims, on which are four strong quartz veins with high-grade silver minerals in evidence; also the *Blue Grouse* group of three claims, with a strong vein striking at right angles to that of the *Elkhorn*.

Ore shipped during the year, 130 tons, with analysis as follows: Silver, 51.2 oz. a ton; gold, 0.143 oz. a ton; lead, 1.4 per cent.; zinc, 2.4 per cent.; sulphur, 2.6 per cent.; silica, 52.5 per cent.; iron, 6.6 per cent.; lime, 6.4 per cent.

TEN-MILE CREEK (COPPER).

Aberdeen.—This mine has been unwatered and arrangements are being made to resume development-work.

To enable the more profitable mining of this and the Highland Valley districts, where immense bodies of copper have been proved, a railway from Highland valley via the Aberdeen district to Coyle is being suggested in mining circles. The grade is fairly good and the distance from Highland valley to Coyle Railway Station is about thirty-two miles.

OFFICE STATISTICS—NICOLA MINING DIVISION.

Locations recorded	130
Free miners' certificates	142
Certificates of work	150
Bills of sale	13

VERNON MINING DIVISION.

REPORT BY L. NORRIS, GOLD COMMISSIONER.

I beg to say that lode-mining has come practically to a standstill in this Division. Evidently we are not in the mineral-belt.

During the year 1919 there was practically no placer-mining.

OFFICE STATISTICS—VERNON MINING DIVISION.

Free miners' certificates	129
Mineral claims recorded	20
Placer claims recorded	2
Certificates of work	14
Transfers	3

YALE MINING DIVISION.

REPORT BY H. BEECH, MINING RECORDER.

I have the honour to submit the annual mining report and office statistics for the year ending December 31st, 1919.

PLACER-MINING.

Renewed interest has been shown in the above branch of mining during the year. Although the River Gold Recovery Company removed its machinery from its lease near Hope, there have been many inquiries as to the placer prospects on other parts of the Fraser river and two applications have been filed on placer-ground near Yale.

LODE-MINING.

Extensive development-work has been done on most of the claims in the Yale Division during the year. Owing to the high cost of labour and materials free-gold properties are not as attractive as formerly. The high price of silver has drawn a number of prospectors into the silver-bearing areas at Summit camp, 23-Mile, and Eureka mountain. In all these places a number of new claims have been located on proved silver-bearing lodes. New claims were also staked near the *Queen* mine at Yale.

Emancipation Mining Co.—This company made two small shipments of ore during the year, amounting to 11 tons, which averaged about $350 a ton; exact figures are not yet available from the management. A small gasolene-hoist has been installed preparatory to sinking the winze on the high-grade ore.

Snowstorm Group.—This group is owned by J. O'Connell, who has done considerable development-work since his return from the war.

Emigrant Mines, Ltd.—Apart from the annual assessment-work, nothing further was done on this property. Lack of capital and high costs has tended to retard the opening-up of free-gold properties in this Division.

The high price of silver has awakened fresh interest in the Summit camp, 23-Mile, Eureka mountain, and *Queen* mine. New claims have been staked and a mild boom in silver properties has taken place.

OFFICE STATISTICS—YALE MINING DIVISION.

Free miners' certificates issued	142
Locations recorded	170
Certificates of work issued	93
Bills of sale recorded	26

ASHCROFT MINING DIVISION.

REPORT BY J. S. ALEXANDER, MINING RECORDER.

I have the honour to submit my annual report as Mining Recorder for the Ashcroft Mining Division for the year 1919.

The greatest mining activity in this district centres around Highland valley, in which are a large number of claims, nearly all of which are being worked. I understand the Resident Mining Engineer is making a detailed report covering the work done during the past year on the claims situated in this vicinity.

OFFICE STATISTICS—ASHCROFT MINING DIVISION.

New locations recorded	81
Certificates of work	128
Conveyances, etc.	32
Free miners' certificates issued	110

KAMLOOPS MINING DIVISION.

REPORT BY E. FISHER, GOLD COMMISSIONER.

I have the honour to submit the annual report on the Kamloops Mining Division for the year ending December 31st, 1919.

There has been no active development-work during the past year, although considerable interest has been shown in the Division by outside parties. Assessment-work has been well kept up and the number of new claims recorded shows a large increase from the previous year.

The *Iron Mask* mine has been working steadily throughout the year, and production has, I understand, been about the same as for 1918.

Steady development-work has been carried on at the *Queen Bess* group. The concentrator has been completed, a shipment of silver-lead concentrates was made, and a considerable amount of zinc concentrates is being held at the mine pending favourable market conditions.

The *Lydia* group, where a large amount of work has been done, was closed down and the option allowed to lapse.

The option of the Granby Company on the *Copper King* and *Camp McLeod* groups has also been dropped, but the owners expect that work will be starting up again shortly now that the trail into the claims has been completed.

Work was also stopped and the option allowed to lapse on the *Homestake* group, but negotiations are now under way for a new option.

Properties were examined by mining men at Birch island, Barriere river, Adams lake, Vavenby, and Seymour arm, and favourably commented on, and it is expected as a result of these examinations there will be considerable activity on the properties at these places during the coming year.

Active work was started on coal properties at Chu Chua by a Seattle syndicate, which has obtained an option on the properties, and a seam of excellent quality of coal about 40 inches wide is now being worked. A shipment of four cars of coal a month is being made to the *Queen Bess* mine at Blackpool.

Near the end of the placer-mining season some good coarse gold was discovered by James D. McKay on 3-Mile creek, a tributary of Nehalliston creek, on the North Thompson river, and as a result a number of claims were located, but owing to the lateness in the season little work could be done. What was done, however, gave promising results, and it is the intention of the owners to push the prospecting of these claims as soon as conditions permit.

A few placer claims were taken up on Louis creek, but I have no report as to the result of the work done there.

OFFICE STATISTICS—KAMLOOPS MINING DIVISION.

Free miners' certificates	369
Mineral claims recorded	236
Placer claims recorded	30
Placer creek leases	2
Certificates of work issued	174
Bills of sale	37
Mining receipts	$4,034.25

Queen Bess Mine, Kamloops M.D.

Fleming Coal Co.—Loading-bunkers.

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WESTERN DISTRICT (No. 6).

Report by Wm. M. Brewer, Resident Engineer.

INTRODUCTION.

The Western Mineral Survey District (No. 6) includes the seven most westerly Mining Divisions in the Province. These are Alberni, Clayoquot, Quatsino, Victoria, and Nanaimo on Vancouver and adjacent islands, and New Westminster and Vancouver on the Mainland.

It is unnecessary to repeat the description of the sections into which, for convenience of reference, these various Mining Divisions of the Western Mineral Survey District are divided, as these were published in the Annual Report for 1918.

Although the number of shipping metalliferous mines in District No. 6 has not been increased during 1919, yet progress in the mineral industry has been satisfactory because systematic development-work on a larger scale than in the past has been done on several mineral claims with very gratifying results. In this connection it is expected that the Consolidated Mining and Smelting Company of Canada will install two concentrating-mills—one of 500 tons capacity on the *Sunloch* mine on the Jordan river, in Victoria Mining Division, and the other in the vicinity of Elk lake near the South-east arm of Quatsino sound—to treat the ore in the *Old Sport* mine. It may be well to note that, although it is generally recognized that the Consolidated Company owns the control in both of these properties, they are recorded as being owned by the Sunloch Mines, Limited, and the Coast Copper Company; the first named operating the *Sunloch* mine and the last named the *Old Sport* mine.

The introduction of corporations possessed of ample capital to thoroughly and systematically develop mining properties in No. 6 District instead of attempting to ship ore before any quantity of "actual" or "positive" ore has been blocked out is a factor of very great importance to the industry. A large proportion of the failures in the mining industry is the result of attempts to open new mining properties by individuals and corporations which either do not possess sufficient cash capital or else fail to realize how necessary it is to carry on development-work to the point where sufficient "positive" ore is blocked out to determine the productive capacity of the property, so that every economy in construction and operation of the mining and metallurgical plants can be taken advantage of.

In this connection the *Indian Chief* group of mineral claims on Sidney inlet, west coast of Vancouver island, is an illustration. In 1916 a concentrating-mill was rushed to completion in order to make shipments. In this mill boilers were installed to generate steam for power instead of taking advantage of a near-by water-power. Necessary development-work in the mine was neglected. In consequence it was found to be impossible to supply the mill with a grade of ore sufficiently high to pay and the mill and mine were closed down. Later new capital was subscribed and a new manager appointed in 1918, who has since directed all his efforts towards extending the development-work until he has demonstrated that there is sufficient "positive" ore blocked out to warrant the installation of a water-power plant instead of steam, and thus reduce the cost of treating the ore in the concentrating-mill nearly $2 a ton by cutting out the necessity of purchasing coal for the boilers.

The year 1919 has witnessed the first production of manganese ore and talc in District No. 6. Manganese was mined on the group of mineral claims known as *Hill 60* near the outlet of Cowichan lake, and shipped to the Billroy Alloys Company, Tacoma, Wash.

Talc of good quality was mined from a deposit on Wolf creek, a tributary of Leech river, in the Victoria Mining Division, from which it will be shipped to the paper-mills by way of the Canadian National Railway, the track of which is about half a mile from the deposit.

The completion of the Island Division of this railway should have considerable influence in promoting the progress of the mining industry along its route, especially in the vicinity of Leech river, where there are several occurrences of talc and some of gold-bearing quartz in the Leech River formation of rocks, which Clapp refers to as the oldest rocks on Vancouver island and as belonging to the Carboniferous period. This formation occupies a belt which

averages about four miles in width and extends across Vancouver island, with its eastern boundary near Goldstream river and its western at Port San Juan.

Owing to a popular demand that every encouragement be offered by the Government to assist the establishment of the iron and steel industry in British Columbia, legislation was passed at the 1919 session of the Legislature entitled the "Iron-ore Supply Act." A great deal of the writer's time was occupied during the year in administering this Act, which will be referred to later in this report under the head of "Vancouver Mining Division," in which the plants for making experiments are located.

The coal-mining industry is the most important in District No. 6, but the conditions with regard to it are so fully covered in the reports of the Inspector of Mines that in order to avoid duplication the writer will only make brief reference to it later under the heading of "Nanaimo Mining Division."

Prospecting for oil has been carried on by a few of the companies organized locally, but to date the results have not been satisfactory. The lower Fraser valley has been the scene of activity during 1919. This feature of the mining industry will be referred to in greater detail under the heading of "New Westminster Mining Division."

The conditions with regard to labour in the mining industry in District No. 6 have during 1919 been satisfactory indeed, exceptionally so when compared with the unrest resulting in strikes in other sections of the world in the mining and other industries. Even during the big strike in Vancouver the leaders were unable to create any discord amongst the miners either in the coal or metalliferous mines in the Western Mineral Survey District of British Columbia. For some years past the colliery-owners on Vancouver island have been working on the collective-bargaining system. Each company bargains with a committee elected by pit-head ballot from amongst its own employees, and this system is found to work so satisfactorily that no difficulty presented itself at the conferences held a short time back when new wage schedules were adopted for a term of three years from the autumn of 1919 that are mutually satisfactory. The miners' committees are elected by their fellow-workers in each mine, and the general managers of the companies take a broad view, and are always willing to receive the committee from their own employees for conference and discussion of any grievances, which conferences are carried on by both manager and committee in a friendly spirit.

One of the most gratifying features with regard to the coal-miners is the general desire to acquire knowledge relative to mine-rescue and first-aid work. Each colliery company encourages the miners to form teams under competent captains and to meet in competition for prizes at stated intervals, when the rivalry displayed equals that amongst the football or baseball teams.

The enthusiasm shown by the miners is illustrated by the fact that the Sunday morning lectures held at Nanaimo are usually attended by about 200 men, who show such interest and undivided attention that the doctors, mine managers, and others who prepare addresses on subjects connected with first aid, safety first, explosives, mine gases, etc., are well repaid for their efforts.

So far as regards the labour conditions in the metalliferous mines in District No. 6, the Britannia Mining and Smelting Company, Limited, employs a larger number of miners, millmen, and other classes of labour than any other metalliferous mining company in the district. The management in giving employment is endeavouring, as far as possible, especially since the Armistice was signed, to select men who saw service overseas, and at the time of the writer's visit to the mine in November last he was informed by the assistant manager that there were then nearly 400 returned soldiers on the pay-roll, who without any exception were giving complete satisfaction.

The production of District No. 6 during 1919 was: Copper, 17,062,100 lb.; gold, 5,514 oz.; silver, 104,806 oz.; manganese, 530 tons; coal, 1,699,348 tons (of 2,240 lb.).

The lack of copper-smelting facilities in the district, it is expected, will be rectified some time during the summer of 1920, when the Ladysmith Smelting Corporation proposes to blow in the Ladysmith smelter after it is overhauled, remodelled, and improved. W. J. Watson, the smelter manager, advises the writer that his company has carried development-work on their Latouche Island copper-mine to the point where there is an ample supply of ore blocked out, available for shipment at regular intervals to enable the smelter to be kept in continuous operation independent of any custom ore. The company will, however, be prepared to treat

custom ore in connection with its own, and has bonded some properties in District No. 6 in order to be assured of a sufficient supply of fluxes.

In concluding the introduction to his report, the writer desires to express his thanks and appreciation for the uniform courtesy, many favours, and assistance he has at all times received from mine managers, the staffs of mining companies, prospectors, and mining men generally. He also desires to thank the staff of the British Columbia Branch of the Geological Survey of Canada, as well as visiting engineers and geologists, for many favours and much valuable assistance rendered.

CONVENTIONS.

In 1919 the city of Vancouver was the scene of two notable conventions relating to mining. The first was held in March as an International Mining Convention organized by the British Columbia Chamber of Mines, and the second was held in November as the annual meeting of the Canadian Mining Institute. The success which attended both of the functions was to a great extent due to the energy, initiative, and perseverance of Dr. Edwin T. Hodge, Professor of Geology at the University of British Columbia, who accepted the onerous duties which fall to the lot of chief organizer of such events. He was ably assisted on both occasions by committees formed from resident members of the Canadian Mining Institute and the Chamber of Mines.

Several interesting and instructive papers were read which provoked considerable discussion, and were fully reported by the daily as well as the technical press, which was well represented at the meetings and was quite generous in the quantity of space devoted to the reports of the proceedings.

T. A. Rickard, editor of the *Mining and Scientific Press* of San Francisco, attended the convention in March as a guest of honour, when he graciously acceded to the request to address the meeting. This he did at an evening session, taking for his subject, "Mining as an Investment." The attendance on each occasion was large and the mining sections in the Pacific States south of the International Boundary were well represented by mining engineers, geologists, and metallurgists.

The annual meeting of the Canadian Mining Institute was attended by H. Mortimer Lamb, the general secretary of the institute, who, in company with many of the members resident in Eastern Canada, travelled across the continent in private cars. Some of these members presented papers on mining and metallurgy, which were followed by much instructive and interesting discussions. Members resident in the northern, eastern, and southern sections of the Province attended in considerable numbers, and the meeting was generally regarded as being one of the most successful in the annals of the institute.

Following the International Convention an excursion to Britannia Beach, Howe sound, was participated in by about 100 of the delegates, who were conducted through the mill and a part of the underground workings at the mine of the Britannia Mining and Smelting Company, as well as being hospitably entertained by the officials of the company, for whom three cheers and a tiger were given.

Following the annual meeting of the Canadian Mining Institute, some of the members enjoyed a trip to the Nanaimo, South Wellington, and Cassidy coal-mines on Vancouver island, while others made an excursion to Britannia Beach and were afforded an opportunity to examine the concentrator and electric power plant. Both parties expressed great appreciation for the hospitality and courtesy extended by the officials of the several companies, whose plants were visited.

In this connection reference may be made to the acceptance by Chas. Camsell, of the Geological Survey of Canada, to the secretaryship of the Western Branch of the Canadian Mining Institute, and also that the name of this branch will in future be known as the "British Columbia" Branch instead of "Western."

PROSPECTING.

In the 1918 Report of the Minister of Mines the writer devoted some space to the subject of "Favourable Districts to prospect," and in the present report desires to emphasize those remarks, because during 1919 prospectors report the discovery of good properties in some of the sections referred to in the 1918 Report. The mountains between Howe sound and Jervis inlet and north-westerly from the latter were recommended.

It is gratifying to be able to record that in one section which was referred to in the writer's report for 1918 as a favourable district to prospect, at least one party of prospectors, of which Thomas Lillie, of Pender harbour, was a member, was successful in discovering during 1919 some bodies of chalcopyrite ore carrying good values in copper as well as low values in gold and silver, near Mount Diadem, westerly from the mouth of Britain river, which flows into the west side of Jervis inlet.

In this connection it may also be noted that E. M. Allison, a prospector of Sardis, with associates, made discoveries of copper-bearing ore in the Chilliwack Lake section of the New Westminster Mining Division. These discoveries are situated near the easterly border of the granite batholith of the Coast range, south-easterly from the *Lucky Four* group, which is in the Cheam range of mountains.

While the number of working prospectors who have been exploring the mountains in District No. 6 has been greater during 1919 than for several years past, yet there is room for many more, especially in the mountains north-westerly from Jervis inlet on the Mainland, also on the islands between the Mainland and Vancouver island, as well as on the west coast of that island.

Wm. Poole, of Nootka sound, with partners, is reported to have made discoveries with promising possibilities in the mountainous country adjacent to Tahsis canal, between Nootka sound and Esperanza inlet, on the west coast of Vancouver island, while other discoveries are reported to have been made on Mount Brenton, in the Victoria Mining Division, by an old-time prospector named Jimmy O'Rourke.

All of the before-mentioned sections are strongly recommended to the attention of prospectors, for they cover a vast territory which up to date has only been scratched over. In fact, the whole of District No. 6, with the exception of the portions that are covered by the coal-measures, offers good opportunities to the prospector who is energetic, industrious, and persevering.

The opportunities to-day are better than twenty years ago in this respect, because at present several large mining corporations have their engineers and scouts in the field prepared to examine prospects, which, if attractive and possessed of promising possibilities, they are willing to bond at reasonable prices, provided sufficient time is allowed to permit of doing development-work to determine the value of the prospects and the possibility of developing them into commercial mining propositions.

As proof of this last statement it might be noted that during 1919 the *Lucky Four*, *Big I.*, and *Sunloch* groups of mineral claims have all been bonded; the first named by the American Smelting and Refining Company of the United States, usually referred to as the Guggenheim interests, and the last two by the Consolidated Mining and Smelting Company of Canada; while the writer is reliably informed that the prospects located by Thomas Lillie and partners near Mount Diadem and the *White* group on Deer creek, west coast of Vancouver island, have been bonded by Vancouver syndicates. The old *Lenora* mine on Mount Sicker has been bonded by G. D. B. Turner, M.E., and associates, and a group of claims on Mount Brenton has also been bonded by Louis Levansaler, M.E., on behalf of a syndicate of Tacoma capitalists.

On the Mainland the old *Blue Bells* group of mineral claims near Frederick arm and the *Dawn* group on Thurlow island have been bonded by the Ladysmith Smelting Corporation, Limited.

Such transactions show that the mining industry in District No. 6 is active and promises to progress with rapid strides in the near future, also that when the writer in his report for 1918 recommended some of the before-mentioned properties as good investments for capital, his judgment has been considered good by the representatives of capital seeking mining investments.

The section of the Mainland which forms a part of the Nanaimo Mining Division and lies northerly from the heads of Toba, Bute, and Knight inlets offers every opportunity to the prospector. This district may be said to be *terra incognita*, except along a portion of the Klinaklini river, which flows into the head of Knight inlet. Although at the present time the section is handicapped by lack of transportation, yet the navigable inlets which penetrate the Mainland for several miles afford the prospectors a good chance to establish central camps to which they can transport tools, supplies, etc., by water, and gradually explore the country from the rivers and many creeks, tributaries of those main streams.

This section can also be approached from the easterly direction from Chilcotin plateau, where several large cattle-ranches are located, but, in the writer's opinion, exploration could be carried on more satisfactorily by penetrating from the Coast than by the alternative route.

ALBERNI MINING DIVISION.

Except that there has been the regular assessment-work done on the mineral claims that have not yet been Crown granted, and that some prospecting has been done in the mountains adjacent to Uchucklesit harbour and Henderson lake, Barkley sound, there is practically nothing to record with regard to activity in the mining industry in the Alberni Mining Division during 1919.

The prospects for the coming year, 1920, appear to be brighter than usual, for the reason that it is reliably reported that the Consolidated Mining and Smelting Company of Canada has taken a long bond on the *Big I.* group of mineral claims at the head of Drinkwater river, about ten miles by trail northerly from the head of Great Central lake, and proposes to thoroughly and systematically prospect the group by diamond-drill borings and working-openings. This group was described in the Annual Reports of the Minister of Mines for 1906 by H. Carmichael and for 1916 by the writer.

The fact that the Canadian Pacific Railway Company is building a branch from the Alberni branch of the Esquimalt & Nanaimo Railway to the foot of Great Central lake will relieve to some extent the handicap of lack of transportation, which has in the past proved quite a difficult barrier to overcome when attempting to interest capital in developing the centre of Vancouver island.

CLAYOQUOT MINING DIVISION.

A few prospectors and some returned soldiers have been working in the Clayoquot Mining Division during 1919. Except on the *Indian Chief* group of mineral claims on Sidney inlet, there has not been any marked activity in the mining industry, but there has been sufficient to warrant drawing attention to it in detail in the following report.

Tofino Section.

Kennedy Lake Subsection.

During the past summer the writer recommended that the trail up Elk river from the head of Kennedy lake be cleared out and repaired. This was done and prospectors can now easily travel for about three miles above the landing on the *Leora* mineral claim.

There are about ten mineral claims recorded on Elk river above the *Leora* claim, including the *Rose* group of four claims, that is Crown-granted. No work other than the usual annual assessment-work has been done on any of the claims for several years, although narrow veins of gold-bearing quartz occur on the *Rose* and *Leora* properties, while on others are outcroppings of copper-sulphide ore of good grade. Under present conditions with regard to transportation the properties are badly handicapped, not only because of the rapids between the foot of Kennedy lake and Kennedy river, but also because of the rapids in Elk river, which prevents navigation above its confluence with Kennedy lake, while the rapids at the foot of the lake hinders gasolene-launches from entering the lake from Tofino inlet. Some time in the future this handicap will possibly be removed through the Canadian Pacific Railway extending the branch which is now being built to the foot of Great Central lake. Until some such railroad-construction is carried out it is quite unlikely that any mining operations of importance will be attempted on Elk river.

Wanderer Group.

L. Grant, of Tofino, the owner of this group of two mineral claims near the head of Kennedy lake, reports that he has been further prospecting the claims since they were examined in 1918, when they were reported on in the Annual Report of the Minister of Mines for that year, page 262. He says he has made arrangements to do considerable more work during 1920, and proposes driving a drift-adit on the gold-bearing quartz vein at such a depth as will prove it to a depth of at least 100 feet. The work done during 1919 exposed a quantity of high-grade, free-milling, gold-bearing ore, also indications that the vein maintains its continuity with considerable persistence. Several fine specimens of native gold in quartz were found during the course of work in 1919.

The transportation problem is not difficult to solve so far as this property is concerned, because it is only about a quarter of a mile from the lake-shore at an elevation of about 300 feet above the level of the lake, and the ore being well adapted for treatment by concentration, it can be reduced near the mine-workings and the concentrates shipped in such quantities as can be easily handled at the rapids, and transferred to deep-draught vessels at the Clayoquot Cannery wharf near the foot of the rapids.

Northern Crown Group.—J. E. Martin, of Tofino, the owner of this group of mineral claims, which was described in the Annual Report for 1918, page 263, has continued development-work during 1919 on a limited scale. This work has resulted in demonstrating that the prospect has quite promising possibilities.

O.K. Group.—No work has been done in 1919 on this group of mineral claims, which was described on page 262 of the Annual Report for 1918. The writer is informed that the group was examined by a mining engineer representing Eastern capital, but could not ascertain the result of the examination.

Deer Creek Subsection.

White Group. This group consists of five mineral claims known as the *White*, *Norman*, *Walton*, *Dunlop*, and *Alpha*, situated on the northerly side of Deer creek about a mile and a quarter above its mouth at the head of Tofino inlet, at an elevation of about 2,500 feet above sea level. The group is owned by Duncan McMillan, of Duncan, and Wm. Walton, of Clayoquot, and is reached by following a good trail from the head of Tofino Inlet.

Geology.—The country-rock on the *White* group is mainly diorite very much altered, sheared, and fissured. Associated with the diorite are zones of contact metamorphism which in places appear to attain very considerable widths. In the zones of contact metamorphism the non-metallic minerals garnet and epidote occur in large quantities and form the gangue, in which occurs lenses, masses, and small particles of copper ore, chiefly chalcopyrite, disseminated through it. The fissures in the shear-zones in the contact-metamorphic rocks afford very favourable opportunity for the deposition of ore-bodies.

Characteristics of the Ore-deposits.—There are quite a number of outcroppings of copper ore, chiefly chalcopyrite, on a bench about 2,500 feet elevation above sea-level and near the mine cabin. Some of these appear to have slipped down from higher altitudes in the side of a mountain which forms a prominent landmark. It is the divide between Deer and Tranquil creeks, and there is a wide fissure in the mountain-side which apparently is the source of some of the chalcopyrite ore found on the bench.

Samples from two of the outcroppings or lenses near the cabin assayed:—No. 1: Gold, trace; silver, 1.6 oz.; copper, 11.5 per cent. No. 2: Gold, trace; silver, 1.6 oz.; copper, 12.5 per cent. These samples were taken when an examination was made in 1918. No samples were taken on November 8th, 1919, when the property was again examined, because there was practically no change in conditions where the samples were taken, except that a larger quantity of ore is exposed than in 1918, the quality of which is so obvious to the naked eye that further sampling was not necessary. There is about 100 tons of chalcopyrite ore exposed in the several open-cuts on this part of the property.

During the past season considerable prospecting-work has been done in order to determine the source or origin of the ore exposed in the open-cuts. Most of this work has been confined to prospecting the wide fissure in the side of the mountain before mentioned.

At a point about 100 feet higher elevation than the cabin there is an outcropping of gossan or iron-capping with some chalcopyrite ore in the precipitous face of the fissure, measuring about 15 feet high by 15 feet wide, but in such a position as to make it very difficult to work. For that reason an adit has been started about 25 feet below the outcropping. This has not been driven sufficiently far to expose solid ore, but the face, which is in metamorphic rocks with much garnet and epidote, indicates the possibility of exposing an ore-body within a short distance.

About 50 feet higher elevation than the occurrence of the gossan-outcrop there is a bench on the mountain-side extending in a south-westerly direction, along which the fissure mentioned has been traced and prospected to some extent for about 300 feet, which work has exposed some chalcopyrite ore disseminated through the contact-metamorphic rock which fills the fissure between walls of dioritic rock.

Central West Coast Section.

Bedwell Sound Subsection.

On November 9th and 10th a visit was made to Bear river, which flows into Bedwell sound, for the purpose of making an examination of the *Seattle* and *Ptarmigan* groups of mineral claims, but a severe rain-storm accompanied by snow in the mountains, together with the impassable condition of the trail to the *Seattle* group, rendered it impossible to make the

examinations within the time at the writer's disposal; consequently such examinations had to be postponed until the season of 1920.

Ptarmigan Group.

It is expected that operations will be resumed on this group of mineral claims during 1920, as Mr. Johnson, the chief engineer for the Ptarmigan Copper Mines, Limited, returned from service overseas during the summer of 1919, and paid a flying visit to a portion of the property in order to ascertain the conditions; as since work was suspended immediately war was declared in November, 1914, there has been no caretaker on the property. Owing to this the camp buildings at the mouth of Bear river are in a state of disrepair, and the contents, which included a large quantity of dynamite as well as general mining supplies, are ruined. The cable and terminals of the aerial tramway which were taken from the *Tyee* mine on Mount Sicker to be used for transporting ore down the Ptarmigan mountain are extremely rusty, but possibly will be found in good enough condition for use for light loads. The wagon-road which the Ptarmigan Copper Mines, Limited, constructed from the beach up the Bear River valley is in quite a bad condition and unfit for hauling even light loads over until repairs are made.

The location of the *Ptarmigan* group of mineral claims is very interesting, because it is on the western slope of the Big Interior range of mountains, which forms the backbone of Vancouver island, at an elevation of about 6,500 feet above sea-level, and from which the waters flow in three directions—northerly towards Buttle lake and Campbell river, southerly towards Great Central lake and Alberni canal, and westerly towards Bear river and Clayoquot sound.

Sidney Inlet Subsection.

Indian Chief Group.

This group contains eight mineral claims owned by the Tidewater Copper Company, Limited; H. B. Price, of Victoria, general manager. The group is located in the mountains northerly from the West arm of Sidney inlet, with the main mine-workings connected with the concentrating-mill at the beach by an aerial tramway. Although the *Indian Chief* group has been described in the Annual Reports of the Minister of Mines for 1917 and 1918, it is again referred to because of the extensive development-work that has been done during 1919 and which was examined by the writer on November 4th, 5th, and 6th.

Geology.—Although the geologic conditions which surround the *Indian Chief* group were described in detail in the Report for 1917, it is necessary to again refer to those conditions in order to convey an intelligible idea of the results from the further development-work that has been done since that report was made.

The rock classified in that Report as grey granite has since been more precisely classified by Victor Dolmage, of the Canadian Geological Survey, as granodiorite. This rock extends from the beach up the side of a mountain to an elevation of about 1,300 feet, where it contacts with garnetized limestone, in which occur ore-bodies composed chiefly of bornite with small quantities of chalcopyrite and chalcocite. A portion of the summit of the mountain referred to is on the *Scotlet* and *Victor* mineral claims of the *Indian Chief* group, where it reaches an elevation of about 1,900 feet, but in a westerly direction from these claims the summit is at a much higher elevation. The rock on part of the summit of the mountain is andesite, which appears to occur as an intrusion in the metamorphosed limestone, and in No. 3 East adit, driven into the mountain at an elevation of about 1,500 feet, this andesite rock is well exposed. At the face of the No. 2 East adit, or "Green" drift, the contact between limestone and andesite is also well defined at an elevation of about 1,550 feet, where the andesite appears to form the north-westerly boundary of the ore-bodies on the southerly side of the mountain.

On the northerly side of the mountain a contact occurs between limestone and granodiorite as an intrusion in the metamorphosed limestone, and in No. 3 East adit, driven into the mountain apparently corresponds with that occurring between similar rocks on the southerly side of the mountain, and also appears to mark the boundary of the ore-deposits; at least up to the present time no outcroppings of ore have been found on the mountain-sides below the line of this contact.

Characteristics of Ore-deposits. The ore-deposits on the *Indian Chief* group of mineral claims belong to the contact-metamorphic type. The mineralization consists of bornite, some chalcocite, chalcopyrite, magnetite, and some iron pyrite in a gangue composed of garnet, epidote, and metamorphosed limestone.

Map of
UNDERGROUND and GENERAL GEOLOGY,
TIDEWATER COPPER COMPANY
MINES at SIDNEY INLET,
CLAYOQUOT MINING DIVISION
B.C.
SCALE
0 100 200 300 400 500 600 feet.
To accompany Report of W.H.Brewer, Res. Engineer. 1919
Legend
Granodiorite.
Metamorphosed Limestone.
Limestone.
Andesite.
Workings
DEWDROP FR
L 581
VICTOR
L 571
VICTOR FR.
L 584
SCOTLET
L 582
TINNICANUM
L 580
Northside Adit No 1 El. 1723'
Northside No 2 Adit
El 1661
Northwest Drillhole
El 1564
El 1867
No 3 East
No 2
No 2 East Green drift
El. 1536'
Diamond Drill Sta.
Hole 1
Hole 2
Hole 3
Hole 4
Hole 5
Hole 6
El 1562
El 1568'
Bonthrone Adit
El 1430
Raise
Slope No 2
Slope No 1
Adit No 1 El. 1610'
ADIT No 3
El 1432'
ADIT No 2
El. 1550'
To Sidney Inlet 1½ miles
Southwest Drillhole
No 1
ADit El. 1930
cut El. 1715'
cut El. 1820'
ADIT No 1
El. 1737'
cut El. 1930'
cut El. 1930'
cut El. 1930'
cut El. 1930'
cut El. 1960'
cut El. 2030'
Adit El. 2040
Adit 2000
creek
creek
Trail
Trail
N 15° E 635 ft
N 65° 09 W 972 ft
S 40° 30 E 851.6'
N 89° 30 E
S 82° 30 W
N 56° 17 W 1500'
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There are apparently two systems of ore-bodies, as shown by the accompanying sketch; these are known as the "South" and "North." The "South" system is composed of the lenses and veins which occur on the southerly side of the mountain and have been developed by adits Nos. 1, 2, and 3, Bonthrone, and No. 2 East, or "Green" drift; the "North" system is composed of the ore-bodies which occur on the northerly side of the mountain and have been developed by the North side adits Nos. 1 and 2. There is approximately 450 feet of ground that has not yet been prospected between the present face of No. 2 South adit at an elevation of 1,550 feet and the face of No. 1 North adit at an elevation of 1,726 feet.

In the following report the characteristics of the "South" system of ore-bodies will be discussed first, and it is interesting to note that, although the surface rocks exposed over the unprospected zone between the "North" and "South" systems of ore-bodies indicate the rock formation to be an intrusion of barren andesite, yet in the face of the No. 2 South adit on November 4th last ore was exposed, an average sample of which assayed 0.73 per cent. in copper, while a picked sample assayed 1.2 per cent. in copper. This exposure occurs at a point about 100 feet in a north-westerly direction from the junction of the No. 2 East adit, or "Green" drift, with the main No. 2 adit, which is about 800 feet from the portal of the main No. 2 adit.

The occurrences of ore exposed by the No. 2 South side adit on the south side of the mountain constitute a series of swells or enlargements in a vein, the strike of which is irregular, and apparently follows the line of least resistance in the metamorphosed limestone, because for about 200 feet from the portal the line of strike of the ore-body is north-westerly; then for about 375 feet it strikes in a north-easterly direction, when the strike changes again to north-westerly for about 250 feet, where it turns almost directly towards the west and continues in ore in that direction for a distance of 156 feet to the face of the West drift on November 4th, 1919. About 50 feet northerly from the junction of the main No. 2 South side adit and the West drift from it, just referred to, a ledge of barren white limestone is exposed, which apparently forms the northern boundary of the ore-body driven on by the main No. 2 South side adit.

The No. 2 South side adit is driven through the barren limestone for a distance of 80 feet, when a vein of ore is intersected which strikes in an easterly direction, is 5 feet wide, and corresponds with the ore exposed in the No. 2 East adit, or "Green" drift. After crosscutting this ore for 5 feet andesite occurs, and the main No. 2 South side adit is continued through that rock for about 100 feet, when the ore is exposed near the face of the drift, from which samples showed the assay results already mentioned.

The portal of the No. 2 East adit, or "Green" drift, is 550 feet northerly from the portal of the main No. 2 South side adit and within a few feet of the same elevation. This adit is driven towards the west and was started in the mountain-side as a prospecting-drift to determine the value of a mineralized outcropping which assayed about 1 per cent. in copper. It was driven 200 feet to the point where it formed a junction with the No. 2 main South side adit. The "Green" drift is driven in ore the entire distance, and samples taken by the superintendent in 5-foot sections showed by assay an average of 1.2 per cent. copper for the first 100 feet and 1.4 per cent. from that point to the face. At a point 100 feet in from the portal of the "Green" drift a crosscut is driven 73 feet long in ore. For a distance of 28 feet in the crosscut, starting from the main drift, samples taken in sections of 5 feet by the superintendent showed an average content in copper of 4.8 per cent., while the next 32 feet samples in the same manner showed an average content in copper of 2.6 per cent.

At a point in the main No. 2 South side adit about 100 feet beyond the junction of the "Green" drift with the adit a horizontal diamond-drill hole is bored about 200 feet long in a south-westerly direction, which intersected an ore-body, presumed to be an extension of that exposed in the "Green" drift, at a point about 70 feet from the main No. 2 South side adit and about 100 feet west of the face of the "Green" drift. The core from this drill-hole showed 5 feet of ore that assayed 1.5 per cent. copper, and the core also showed that this ore occurred between andesite walls. The diamond-drill boring was continued in andesite until it intersected the West drift from the main No. 2 South side adit near its face, where ore occurs. The drill-cores assayed from 2 to 2.64 per cent. in copper for about 30 feet. When the West drift from the No. 2 main South side adit was driven to intersect the diamond-drill hole and a working-opening made in the ore-body, samples taken of 5-foot sections and assayed by the superintendent showed a copper content of from 1.5 to 2.1 per cent.

The diamond-drill boring was continued in a south-westerly direction for 146 feet from the south-westerly face of the ore in the West drift. Ore was not exposed in this part of the hole for a distance of 50 feet, when the drill-cores showed ore, which was continuous for 56 feet farther, and for that distance the cores assayed an average of 2.1 per cent. copper. Beyond that point andesite was exposed continuously to 146 feet, which was the end of the drill-hole at the time of examination on November 4th, 1919. The management proposes to continue this drill-hole to intersect at depth the ore-body exposed in the open-cut above the No. 1 South side adit. The drill-boring is expected to intersect the ore about 200 feet vertically below the level of that adit and about 600 feet horizontally in a south-westerly direction from the face of the West drift from the No. 2 main adit.

A second examination of the property of the Tidewater Copper Company has revealed interesting and important information with regard to the ore-body exposed underground by the diamond-drill boring from the West drift from the No. 2 main South side adit. A working-opening has been driven from near the face of the West drift in a south-westerly direction a distance of 146 feet, or to the end of the diamond-drill hole. The working-opening exposed the same conditions as regards the occurrence of ore as were shown by the diamond-drill cores and referred to above, that an ore-body occurred nearly 60 feet wide.

At a point in the last-named working-opening about 116 feet from the West drift the ore-body is exposed by drifts driven in both north-west and south-east directions for a total distance of 160 feet, with both of the faces of these drifts still in ore on March 31st, 1920. This ore, sampled every 5 feet with hammer and moil, assays an average of a little over 2 per cent. copper. As this ore-body is exposed in the underground workings nearly 400 feet below the surface of the mountain, it is possible that a tonnage of approximately 250,000 tons may be available without sinking.

The conditions with regard to the "North" system of ore-bodies are that they occur as contact-metamorphic deposits at the immediate contact between metamorphosed limestone and granodiorite. So far as at present known, ore-bodies occur only on the *Victor* mineral claim, and apparently there are two distinct deposits. One of these is developed by No. 1 North side adit, which was fully described by the writer in the Annual Report of the Minister of Mines for 1917, page 252, and as no further development-work has been done at that point since, it is not necessary to repeat the description in the present report.

The second ore-body is developed by No. 2 North side adit and is apparently connected with the ore-body exposed in the old "Robinson" cut at an elevation of about 60 feet below the No. 1 North side adit. The "Robinson" cut and a shallow shaft were work done for assessment about 1902, when ore carrying less than 5 per cent. copper could not be mined, shipped, and smelted profitably.

The ore-body exposed in No. 2 North side adit appears to strike in a N. 70° W. direction and dips nearly vertical, with a slight inclination towards the north. The course of the adit is south; consequently it does not crosscut the ore-body exactly at right angles. The crosscut adit is 86 feet long. For the first 40 feet it intersects mineralized material which, sampled by the superintendent in 5-foot sections, shows the following assay values in copper from 0.5 per cent. at the portal to 1.5 per cent. at a point 40 feet in from the portal. The remainder of the crosscut adit, sampled in 5-foot sections by the superintendent, gave the following assays in copper:—

Sample No. 9, 45 feet from portal } 3.97 per cent.
Sample No. 10, 50 feet from portal }
Sample No. 11, 55 feet from portal, 2.17 per cent.
Sample No. 12, 60 feet from portal, 2.17 per cent.
Sample No. 13, 65 feet from portal, 1.85 per cent.
Sample No. 14, 70 feet from portal, 3.99 per cent.
Sample No. 15, 75 feet from portal, 6.56 per cent.
Sample No. 16, 80 feet from portal, 3.6 per cent.
Sample No. 17, 86 feet from portal at face, 2.62 per cent.

Whether there is any relationship between the ore-body exposed in the No. 1 North side adit and the No. 2, just described, has not yet been determined.

Development.—The development-work done in addition to surface prospecting since the property was examined in 1917 consists of the following: No. 2 South side adit advanced 400 feet; West drift, No. 2 South side adit, advanced 210 feet; No. 3 South side adit advanced 200

feet; upraise from No. 2 South side adit, advanced 40 feet; No. 2 East adit, "Green" drift, driven 200 feet; crosscut from No. 2 East adit, "Green" drift, driven 73 feet; diamond-drilling, about 1,000 feet; No. 2 North side adit driven 86 feet.

At the concentrating-mill at the beach there has been much activity during the past year. A new terminal for the aerial tramway has been constructed and new ore-bins built above the mill. The mill has been remodelled and its capacity increased about 150 tons a day, so that its capacity is now fully 200 tons of ore a day.

The water-power in Mill and Indian creeks has been developed to furnish 350 horse-power under a head of 560 feet. The length of flume from Mill creek to the penstock is 800 feet and from Indian creek to the penstock 4,500 feet. The length of pipe-line from the penstock is 1,600 feet. The water-power is being installed in four units, and steam-power will be abandoned except in a case of serious emergency. One unit of the water-power will drive the rock-crushers, ball and tube mills; one unit will furnish power for flotation plant; one unit for the compressor plant and another for lighting purposes.

The old bunkers on the wharf have been torn down and in future concentrates will be delivered from the mill to the ship by belt-conveyors.

Nootka Subsection.

There has been considerable prospecting during 1919 in the Nootka subsection of the Central West Coast section of Clayoquot Mining Division. This has been confined chiefly to the mountains bordering on the Tahsis canal and Gold river. As mineral claims were only located late last summer, none have been yet examined, but the section, because of the geologic conditions, should prove a promising one to prospect. The prevailing rock formations are of the contact-metamorphic type, and one of the most extensive deposits of magnetite ore in British Columbia occurs in the belt of country which extends from Gold river to Tahsis canal. This is located near the head of Head bay, Tlupana arm of Nootka sound, south-easterly from the part of Tahsis canal where most of the prospecting has been done.

QUATSINO MINING DIVISION.

Since the spring of 1917 there has been but little general progress in the mining industry in the Quatsino Mining Division on the north-west coast of Vancouver island, because, except on the *Old Sport* group of mineral claims on Elk lake, in the South-east Arm section of the Mining Division, there has been no development-work of any considerable extent done in the other sections of the Division.

Early in 1919 the *Yreka* group of mineral claims on the South-east arm of Quatsino sound was bonded by the Tidewater Copper Company, Limited, of Victoria, and the *Yreka* was examined by H. B. Price, the new manager of that company, who proposed working it in conjunction with the *Indian Chief* group on Sidney inlet, but later decided to await the results of the extensive development-work he was carrying on at the last-named mine before starting work on the *Yreka*. There is some probability that during 1920 he will reopen the *Yreka* and ship the concentrating-ore from that property to the flotation plant at Sidney inlet.

Some prospecting was done on mineral claims near Holberg, at the head of the West arm of Quatsino sound, also in the vicinity of Klaskino inlet near Cape Cook, in a southerly direction from the entrance to Quatsino sound.

Operations in this last-named section are much handicapped by the fact that, being exposed to the storms in the Pacific ocean, it is very difficult to make boat-landings except when the weather is quite fair and the sea calm. Some years ago considerable work was done in this vicinity and specimens of free gold in a quartz vein were obtained, but all work on the mineral claims was abandoned and no attention has been paid to this portion of the west coast until last summer.

South-east Arm Section.

Elk Lake Subsection.

Old Sport Mine.

The Coast Copper Company, under the management of Wm. Clancy, has prosecuted development-work vigorously on the *Old Sport* group of mineral claims during 1919. The Coast Copper Company is a subsidiary to the Consolidated Mining, Smelting, and Power Company of Canada. The company

bonded the *Old Sport No. 1, Penstock, Idaho, Edith,* and *Machete* groups of mineral claims in 1916, and after appointing Wm. Clancy as manager, began a systematic extension of the development-work previously done by Clancy for the Quatsino Copper Company, the former owners. Each one of the five groups of mineral claims contains eight claims, and the entire property is known as the *Old Sport* mine.

In the Annual Report of the Minister of Mines for 1916, pages 240-241, also in the Report for 1917, page 255, the *Old Sport* mine is described in detail; consequently in the present report reference will merely be made to the extension of the development-work for the past year, together with an extract from the report by V. Dolmage, of the Geological Survey of Canada, published in Part B, Summary Report, 1918, Department of Mines, Ottawa.

The development-work during 1919 was interrupted for some time during the summer owing to the destruction of some of the camp buildings, compressor plant, etc., by fire, but this damage was repaired as soon as possible by rebuilding the burned buildings and installing new and more modern equipment of increased capacity, and in increasing the horse-power of the water-power plant.

The development-work in the mine has been mainly confined to driving a long crosscut adit to intersect the ore at a vertical depth of about 500 feet below the upper crosscut adit. This lower adit, when finished, will be about 2,000 feet long. In addition to this work, there has been about 7,000 feet of diamond-drill boring along the outcroppings.

In his report V. Dolmage says as follows: "The geological relations of the *Old Sport* ore-body are illustrated diagramatically in Fig. 1. It will be seen that the Quatsino limestone overlies a thick floor of andesite, and has interbedded in it, near its base, a much thinner flow of andesite as well as some very thin beds of tuff. The main concentration of ore is confined to the bed of limestone lying between the two andesite flows. The whole series has been cut by a large intrusion of diorite which has extensively metamorphosed both the limestone and the andesite, and evidently produced the ore. The intrusion is a true diorite, having grey colour and medium coarse texture, and consisting essentially of labradorite, biotite, and augite.

"The limestone where unaltered is very fine grained, exceptionally pure, and well crystallized. It is, however, intensely altered in the vicinity of the mine. The altered parts are extensive, but their outlines against the unaltered parts are remarkably sharp, and the unaltered parts contain no secondary minerals whatever. The altered limestone now consists of garnet, quartz, epidote, serpentine, and actinolite, the latter being abundant. The sulphides and magnetite are largely confined to highly altered limestone and best developed in the garnetite, but some chalcopyrite and pyrite are also found in the altered andesite.

"The alteration in the volcanic rocks is also intense and wide-spread, even occurring at a considerable distance from the exposed contact of the intrusion. This is thought to be due to the sloping nature of the contact and its being brought still nearer to the surface by the steep slope of the hillside. The secondary minerals most commonly developed are quartz, epidote, and actinolite. The alteration to quartz frequently takes the form of a closely spaced series of parallel replacement quartz veins, a quarter of an inch or less in width, though there is also considerable incipient silicification.

"The principal commercial ore-mineral of the *Old Sport* mine as well as that of the district is chalcopyrite, which occurs both as small rounded grains and large irregular bodies several feet in diameter associated with a large amount of magnetite, smaller amounts of pyrite and pyrrhotite, and a very small amount of gold. Pyrrhotite in general is much more plentiful in those deposits situated close to the contact of the diorite, and chalcopyrite is more plentiful in those deposits situated at a distance from the contact.

"There can be little doubt that the copper originated with the magma of the diorite, and was carried up into the limestone and andesite by solutions and vapours which passed along joints and bedding-planes, and was finally deposited where proper conditions were reached. Owing to the more insoluble and therefore more impervious character of the volcanic rocks, the mineralizing solutions would be to some extent guided by them, and have a tendency to develop large channels along the contacts with the more easily soluble limestone and form the largest deposits there. Many basic dykes crosscut the ore. These, similarly, would be relatively impervious and at their intersections with the andesite flows would form troughs in which the invading solutions would be more or less trapped and induced to form rich ore-shoots. In the case of the narrow band of limestone enclosed by the two beds of andesite, as shown on the

diagrammatic section, the conditions are as outlined above, and, as might be expected, the best ore-bodies are in this bed.

"In the *Old Sport* property the depth of the ore-body will obviously depend on the position of the diorite-contact, and this has not yet been determined. The present workings go to a depth of about 500 feet measured along the inclined ore-body, and since very little pyrrhotite is present there and no noticeable increase in amount of it has been detected, it might be expected that the contact is still a considerable distance away and that the ore will persist much farther. The length of the ore-body has been proved on the surface for a distance of nearly 3,000 feet, so that the ore-body is one of considerable size."

West Arm Section.

The West Arm section of Quatsino Mining Division comprises that portion of the Mining Division tributary to the West arm of the sound which extends for about twenty miles in a N. 70° W. direction from its junction with the South-east and Rupert arms near the village of Quatsino.

At the south-easterly end of the West arm, on the north shore around Coal harbour, Cretaceous sandstone, shales, and conglomerates with narrow seams of coal occur. A tract of considerable acreage covered by these rocks is owned by a California syndicate, which about twenty years ago made an attempt to prospect for coal by sinking some shallow slopes and by boring with diamond-drills, but all work was suspended about 1901, the workings filled with water, and no attempt has since been made to resume operations. It is impossible to make any examinations of the old workings; consequently no data as to width of seams underground or possibilities of opening a colliery on a commercial scale can be ascertained.

About a mile west from Coal harbour and at a point from the shore about half a mile there are occurrences of bog-iron ore, from which some 1,500 tons was shipped in 1906 and 1907, but all work was then abandoned and has not been resumed since. There are also other occurrences of bog-iron ore a few miles farther west and about two miles from the shore which were prospected to some extent about 1906, but on which no work has been done in recent years.

These occurrences of bog-iron ore are described by the Provincial Mineralogist in the Annual Report of the Minister of Mines for 1907, and are also referred to in Bulletin No. 3, 1917, Provincial Bureau of Mines, on the iron-ore deposits on Vancouver and Texada islands.

Westerly from the area covered by the Cretaceous rocks, the Vancouver group of volcanics occur. This group is represented by andesites, tuffs, and basalt, interbedded with limestones. The volcanics form the prevailing country-rock on both sides of the West arm, and, indeed, cover a considerable extent of the northern end of Vancouver island beyond the head of the arm.

The section has not yet been prospected with any degree of thoroughness; in fact, only two groups of mineral claims have so far been located near the West arm; one of these is known as the *Bowerman*, which is about six miles in a northerly direction from the mouth of 6-Mile creek; the other, known as the *Millington* group, is on a small tributary of Spruce river about three miles from Holberg at the head of the West arm.

Bowerman Group.

This group contains eight mineral claims, known as the *Jewel*, *Elk*, *F.B.*, *Providence*, *Bell*, *Hope*, *Birthday*, and *Gold-drop*. The owners are E. Spooner, D. Spooner, J. Spooner, F. E. Bowerman, P. Obling, J. Bell, and E. Peterson, of Holberg. The group is reached by walking along a poor trail a distance of six miles from the mouth of 6-Mile creek, which flows into the West arm of Quatsino sound on the north side about six miles below the head of the arm.

Owing to the extremely bad conditions of the weather during the writer's visit to the West arm in November, 1919, and the fact that but little prospecting-work had been done on the property, it was not visited, but a sample of ore that had been brought to Holberg by the owners when they had finished their assessment-work was sent to the Provincial Assayer at Victoria. This sample assayed: Gold, trace; silver, 2 oz.; copper, 0.7 per cent.; lead, *nil*. The mineralization occurs in a quartz gangue.

Millington Group.

This group contains six mineral claims, known as the *Cracker Jack*, *Millington*, *Hood*, *Mollie B.*, *Mollie Bawn*, and *Paystreak*, which were examined by the writer on November 16th, 1919. The group is owned by Dave Spooner, E. Spooner, E. Peterson, P. Obling, J. Bell, and James Spooner, of Holberg.

Location.—The *Millington* group of mineral claims is on a small unnamed creek that flows into Spruce river about two miles and a half above its mouth. Spruce river empties into the West arm of Quatsino sound at the head of the arm near the settlement of Holberg. The group is reached by travelling the wagon-road from Holberg a distance of about two miles, where a trail branches off in a westerly direction to Spruce river, which is crossed on a big log, and the trail continues in a westerly direction to the small creek on which the mineral claims are located, and their boundaries extend up the creek a distance of about 4,500 feet. The claims are staked two abreast and occupy an area of about 3,000 feet from east to west and 4,500 feet from north to south. The general course of the creek is nearly north (mag.), but there are several crooks and turns, and for most of its length the creek-bed is in a rather deep canyon.

Geology.—In the Summary Report, 1918, Part B, Geological Survey of Canada, V. Dolmage states: "The only rock found in the neighbourhood of the *Millington* group of mineral claims is a highly amygdaloidal basalt much fresher than the ordinary members of the Vancouver group. It outcrops for a vertical distance of over 1,000 feet."

Characteristics of Ore-deposits.—In ascending the bed of the creek, which is quite steep, at a point about 400 feet elevation above sea-level, on the *Cracker Jack* claim, there occur outcroppings of bornite ore as impregnations in the basalt country-rock, as irregular masses, and as grains frequently found in the amygdules. Other outcroppings of a similar nature are found at intervals in the bed of the creek for about 300 feet higher elevation. Some of these outcroppings reach a width of about 4 feet almost solid bornite; at other places the country-rock is impregnated merely with grains of bornite associated with a small amount of chalcopyrite.

Apparently the occurrences of ore occupy a zone in the country-rock, striking in a general north-easterly direction, of an undetermined width so far as work has yet shown. The most promising of the several outcroppings of bornite occurs at an elevation of about 500 feet above sea-level, where there is a fairly solid body of ore about 30 feet long exposed in an open-cut. A selected sample from this assayed: Gold, trace; silver, 2 oz.; copper, 21 per cent. Apparently this ore-body does not maintain its continuity with depth, because in an adit driven 20 feet lower altitude with the intention of intersecting the ore there is no well-defined body exposed, but a bunch of low-grade bornite was taken out while driving the adit. A grab sample from the dump at the portal of this adit assayed: Gold, trace; silver, 0.2 oz.; copper, 2.1 per cent.

About 80 feet lower elevation than the open-cut from where the high-grade sample was taken and on the opposite or westerly side of the creek there is another outcropping of bornite as an impregnation about 4 feet wide in basalt country-rock, with other smaller impregnations of similar ore. An adit has been driven in an attempt to intersect the ore-body about 40 feet below the outcropping. Some ore is exposed at the face in the roof of a drift 15 feet long driven to the right from the adit, a sample from which assayed: Gold, trace; Silver, trace; copper, 2.5 per cent.

From the foregoing description it will be seen that, while there are occurrences of high-grade outcroppings of bornite, they are irregular, and the work done underground has failed so far to expose any bodies of bornite of similar grade as that exposed on the surface, but the showings are sufficiently promising to warrant more thorough and extensive prospecting than has so far been done.

Development-work.—The development-work on the *Millington* group of mineral claims has all been done on the *Cracker Jack* claim. This work consists of two adits, open-cuts, and surface-stripping. The No. 1 adit is at an elevation of about 380 feet; it is driven in the right bank of the creek a length of about 70 feet, with drifts to the right and left at a point of 50 feet from the portal. The drift to the left is 21 feet long, that to the right is 15 feet long. No. 2 adit is at an elevation of about 110 feet higher than the No. 1. This adit is about 60 feet long with an open-cut approach about 15 feet long. The main open-cut is about 30 feet long and 4 feet deep.

A good cabin has been built on the property and the trail from the main wagon-road has been partly constructed, also a log bridge across the Spruce river.

In concluding his report on the *Millington* group, V. Dolmage says: "The deposit appears to be that class of mineral-deposit in which native copper is sparingly concentrated in a basic lava, usually associated with zeolites. The peculiar thing about this deposit is that there is no native copper and very little chalcopyrite. However, in the same flow about three miles to the east, native copper does occur in small veins, and as disseminated grains associated with the amygdules."

NANAIMO MINING DIVISION.

The Nanaimo Mining Division, especially that part on the Mainland, has not, in the past, received the attention of prospectors in search of metalliferous minerals to which it is entitled, when the geology, extent, and ease of access, and favourable climatic conditions are considered; consequently the writer may be excused for introducing the most outstanding facts with regard to the Division in the present report.

The fact is often overlooked that within its boundaries there is included a large section of the Mainland in addition to all of the islands between the 49th and 51st parallels of latitude, as well as all of the easterly coast-line of Vancouver island between the same parallels, while its westerly boundary follows the summit of the chain of mountains which forms the backbone of the island and includes the easterly slope and the summit of the Beaufort range. In this range of mountains are the highest peaks on Vancouver island, to wit: Big Interior, 6,500 feet elevation; Dome, 6,500 feet; Beaufort, 6,200 feet; Septimus, 6,200 feet; Arrowsmith, 5,976 feet; Joan, 5,200 feet; Hals, 5,000 feet; Crown, 6,082 feet; Irwin, 3,200 feet; Mark, 3,080 feet; Comox Gap, 3,000 feet; and several lower peaks. The greatest distance from south to north of the Nanaimo Mining Division is attained on a line drawn from the head of Buttle lake about the centre of Vancouver island to the headwaters of the Klinaklini river on the Mainland, a distance of about 175 miles. The greatest distance from the south-east to north-west is attained on a line from the Chemainus river on the east coast of Vancouver island to the south side of Queen Charlotte sound, about 225 miles.

Within the area described on the Mainland are several long fiord-like inlets which form deep indentations penetrating the Mainland for several miles and navigable for the largest vessels afloat. Into the heads of these inlets there flow rivers of considerable size, although not large enough to be navigable except for canoes or small boats. The most important inlets, reading from south-east to north-west are Toba, Bute, Loughborough, Knight, Kingcome, and Seymour. The most important rivers flowing into these are the Toba into Toba inlet, the Southgate and Homathko into Bute inlet, the Klinaklini into Knight inlet, the Kingcome into Kingcome inlet, and the Seymour into Seymour inlet.

Water-powers.—The water-power it is possible to develop in the Nanaimo Mining Division deserves mention because of the great number of streams adaptable for the development of water-powers, only a few of which have up to the present time been utilized.

The following is a list of the streams in the Nanaimo Mining Division in which there are power possibilities, and which have been investigated for the Commission of Conservation, Canada, by Arthur V. White, Consulting Engineer:—

LIST OF STREAMS.

Stream.	Tributary of	Horse-power.	Remarks.
On the Mainland.			
Powell river	Malaspina strait	32,000	Developed by the Powell River Pulp Co.; 24,000 h.p. in operation.
Stafford river	Loughborough inlet	4,000	Licensee, Davison-Ward Co.; not developed.
Forbes river	Homfray channel	1,000	
Brem river	Toba inlet	4,000	
Canyon creek	South fork of Toba river	17,000	
Chewson creek	Toba inlet	5,000	
Hazel creek	Toba river	3,500	
Little Toba river	"	1,600	
Falls creek	North fork of Toba river	5,000	
Owens creek	" "	2,000	
Thomlinson creek	South fork of Toba river	5,500	
East fork of Toba river	Toba river	4,700	
Summit creek	South fork of Toba river	1,000	
Goat creek	" "	500	
	Carried forward	86,800	

LIST OF STREAMS—*Continued.*

Stream.	Tributary of	Horse-power.	Remarks.
	Brought forward	86,800	
On the Mainland—Con.			
Tahumming creek	Toba river	1,000	
Salmon river	Bute inlet	4,500	
22-Mile creek	Southgate river	3,000	
Homathko river	Bute inlet	6,000	
East fork, canyon on	Homathko river	6,000	
West fork, canyon on	„	6,000	
Ice river	„	2,500	
Eckheimick river	„	4,000	
Rodell creek	„	3,000	
Second West tributary....	„	3,000	
Third West tributary.....	„	1,500	
Wawkash creek	Knight inlet	6,000	
Klinaklini river	„	15,000	
Mussel	Klinaklini river	300	
Slide creek	„	3,000	
Sim creek	Knight inlet	6,500	
Huaskin lake	Drury inlet	600	
Warner Inlet lake	Seymour inlet	200	
Seymour river	„	4,000	Queen Charlotte sound.
On East Coast of V.I.			
Nanaimo river	Strait of Georgia, ...	26,000	
Campbell river	Seymour narrows, Strait of Georgia	85,000	Licensee, the Campbell River Power Co.; not developed.
Englishman river	Strait of Georgia	250	Licensee, the British Pacific Hydro-Electric and Tramway Co.; not developed.
Millstone river	Strait of Georgia	1,300	Nanaimo Electric Light, Power, and Heating Co.; partially developed.
Puntledge river	Comox harbour	22,500	Canadian Collieries (Dunsmuir), Ltd.; 20,000 h.p. has been developed; 10,000 h.p. in operation.
„	„	4,600	Site below the Canadian Collieries development.
South fork of Elk river...	Campbell river	600	
Wolfe creek	Buttle lake	500	
Marble creek	„	700	
Myra creek	„	900	
Thelwood creek	„	4,000	
Ralph river	„	600	
Shepherd creek	Ralph river	500	
Salmon river	Johnstone strait	1,200	
White river	Salmon river	5,000	
Memeky river	„	1,550	
Adams river	Johnstone strait	200	
Tsi-itka (Robson) river...	„	500	
Kokish river	„	10,000	
Nimpkish river	Queen Charlotte sound ...	5,500	
Camosun canyon	Nimpkish river	3,500	
Big falls	„	3,000	
1-Mile riffle	„	1,500	
Quartz river	Hardy bay	350	
Shushartie river	Queen Charlotte sound	1,200	
	Total	343,850	

In the foregoing list where there are no notes in the column headed "Remarks" the power possibilities have not been developed or licences applied for, and there are only 35,300 horse-power in actual operation.

There is a very large area of the Nanaimo Mining Division which has never been visited by prospectors and is entirely unexplored; especially is this the case on the Mainland northerly and north-westerly from the westerly shore of Jervis inlet, also on Vancouver island in the westerly part of the Division.

Since the territory occupied by Strathcona Park has been thrown open for the location of mineral claims there has been much activity in staking on Myra and Price creeks near the head of Buttle lake, where about forty mineral claims have been staked during the past two seasons. It is reported that these mineral claims have been bonded by the Temiskaming Mines Company, of Ontario, after having been examined by Joseph Errington, that company's consulting engineer, but operations have not yet been commenced.

Although no prospecting has been done up to the present time in the mountainous country between Myra and Price creeks or Buttle lake and Big Interior mountain, on which are located the *Big I.* and *Ptarmigan* groups of mineral claims, it appears as though that section should offer attractive inducements to prospectors for exploration. Reference to the official maps show that the distance intervening between the Big Interior mountain and the head of Price river is only about three or four miles. It also appears that the mineral-bearing zone in the vicinity of Big Interior mountain is very similar geologically to that in which the Myra and Price Creek locations are made. The intervening country is made up of ranges of high mountains, with the Big Interior peak reaching an elevation of 6,500 feet above sea-level, which is in the north-easterly corner of the Alberni Mining Division; while the westerly slope of that mountain is in the Clayoquot Mining Division.

On the Mainland in the Nanaimo Mining Division but comparatively little prospecting has been done north-westerly from Jervis inlet during recent years, although about twenty years ago there was much activity in the vicinity of Loughborough inlet, Phillips and Frederick arms, and on Thurlow island. During 1919 this section has again been the scene of more activity than during any year since the closing-down of the *Doratha Morton*, *Blue Bells*, and *Douglas Pine* properties. This activity will be referred to again in this report under its proper heading.

The geology on the Mainland in the Nanaimo Mining Division is that which predominates throughout the Coast range; the rock formation is chiefly granodiorite, but in this are found broad belts or bands of altered stratified rocks which were not destroyed by the intrusion of the eruptive rocks, mainly granodiorite, nor carried away by erosion. Occurrences of sulphide ores, mainly chalcopyrite and iron pyrite, are found at and near the contacts of the altered stratified rocks (schists, quartzites, argillites, and limestones) with the intrusive granodiorites and other eruptives.

Illustrations of such occurrences are seen in the *Britannia* mine in the Vancouver Mining Division and the *Lucky Four* mine in the New Westminster Division, both of which are in the Coast range, south-easterly from the Nanaimo Mining Division.

In this connection and as a further encouragement to prospectors to give attention to the Coast range, the following extract from the report of Chas. Camsell, published in the Summary Report, Geological Survey Branch, Canada Department of Mines, 1917, Part B, is quoted: "Geological maps of the western part of British Columbia show the Coast mountains to be made up of a great mass of eruptive rock, mainly granodiorite, forming a belt from 60 to 100 miles wide and 1,000 miles or more in length. Investigations have shown that in the section across the Coast mountains along the Pacific Great Eastern Railway such a simple condition does not exist, but instead there are several broad bands of stratified rocks—schists, quartzites, argillites, and limestones—which lie in the granodiorite and have been intruded by it. These bands are remnants of the old cover of the granodiorite batholith which were not destroyed at the time of intrusion nor removed by later erosion. They all strike parallel with the trend of the range, and consequently their greatest dimension is in a north-westerly direction and their shortest along the line of the railway. The contacts of these bands of stratified rocks with the granodiorite are all more or less mineralized. The lateral contacts are mineralized mainly by copper ores, and on the roof-contacts, that is where the batholith plunges north-westerly or south-easterly under a roof of stratified rocks, the mineralization is often by the more precious metals."

SEYMOUR INLET SECTION.

The Seymour Inlet section of the Nanaimo Mining Division includes that part of the Mainland in the Division tributary to Seymour inlet, the most southerly arm of Queen Charlotte sound. Seymour inlet penetrates the Mainland in an easterly direction for a distance of about fifty miles to the head of Wigwam bay, where Seymour river flows in from a north-easterly direction. About forty miles from the entrance to the inlet there is a branch towards the south-east entered through Eclipse narrows, and about five miles up the branch, which is known as Frederick sound and is about ten miles long, there is a branch towards the north-east known as Salmon arm, which is about five miles long.

Seymour inlet is about two miles wide, with high mountains bordering both shore-lines, and there are only a few places where safe anchorage can be found owing to the exposed and rocky condition of the shores and extreme deep water in the inlet, which is persistent close in to both shores.

There has been practically no prospecting done in the mountains adjacent to the inlet and no mineral claims have been located, except near Wigwam bay, at the head, where there are some occurrences of magnetite which have been staked and recorded. These were visited by the writer in July, 1919, and are reported on as follows:—

Alexander Group. This group contains five mineral claims, known as the *Dolphin*, *Dolphin Fraction*, *Iron Pyrite*, *Gillis*, and *Gillis Fraction*. The group is owned by Colin Jackson and associates, of Vancouver, and the claims are Crown-granted.

Location.—The *Alexander* group of mineral claims is on the easterly side of Seymour inlet above Frederick sound and about five miles from the head of the inlet. The westerly boundary of the group is on the shore-line, where the mountains reach an elevation of several hundred feet, with precipitous slopes. Approach to the outcroppings of magnetite, where prospecting-work has been done, is made by ascending the bed of a small torrential stream which flows into a narrow gut or bay carved out of the mountain-side by erosion in the shore of Seymour inlet. This narrow bay is about 200 feet long by about 100 feet wide and so deep that there is no anchorage, but a launch can lie in safety by having lines fastened to the trees in the precipitous walls, which rise to an elevation of 500 feet on each side, the only danger being from slide-rock, which occasionally breaks down from either side.

Geology.—The country-rock on the *Alexander* group of mineral claims is the Coast Range granodiorite, much of it very much altered and sheared.

Characteristics of Ore-deposits.—There are outcroppings of magnetite about 40 feet wide which are exposed in a deep gulch on the right side of the small creek. These outcroppings have been stripped sufficiently to indicate that the structure of the ore-body is apparently that of a large lens occurring in a shear-zone in the country-rock, but the work has not been sufficient to determine the length or continuity in depth.

The outcroppings are exposed at an elevation of about 300 feet and a distance of about 500 feet from the beach. Along the strike of the ore-body, which is apparently in a north-westerly direction, the walls of the canyon are inaccessible, so that it is impossible to explore the occurrence of magnetite beyond the point where it is exposed. It is reported that there are other outcroppings at the head of the torrential stream, but, as the writer had no guide familiar with the property beyond the point examined, no further examination was made, also because the main object was to ascertain the facilities required for shipping and the upper occurrences are at present practically inaccessible.

A sample taken from the face of the exposed outcropping, which included some enclosed country-rock that cannot be separated in mining, assayed: Iron, 27.6 per cent.; sulphur, 0.05 per cent.; phosphorus, 0.10 per cent.; silica, 37.4 per cent.; titanium, *nil*.

The *Alexander* group was examined by G. A. Clothier, Resident Engineer for No. 1 Mineral Survey District, in 1917, and he reports an analysis, taken from a private report of a sample from an outcropping on another portion of the property, as follows:—

	Per Cent.
Iron oxide, equivalent to 60 per cent. metallic iron (Fe_3O_4)	83.32
Alumina (Al_2O_3)	7.60
Silica (SiO_2)	6.37
Lime (CaO)	1.80
Sulphur (S)	0.30
Combined water, etc.	0.11

Phosphorus (P)	Trace.
Magnesia (MgO)	Trace.
	99.50

Kitchener Group.

This group contains ten mineral claims and two fractions. The group is owned by Gordon McLaren, D. H. Martin, and associates, of Vancouver, and is situated on the west side of Seymour inlet, about seven miles from the head of the inlet, a short distance inland from a small bay, locally known as Haig bay, which affords good shelter and anchorage for vessels.

This group is in the Bella Coola Mining Division and was reported on by G. A. Clothier, Resident Engineer for No. 1 Mineral Survey District, in the Annual Report of the Minister of Mines for 1917. The examination made by the writer in 1919 was for the purpose of ascertaining the facilities for shipping ore, in case any tonnage was needed under the provisions of the "Iron-ore Supply Act, 1919." As the property is not in the Nanaimo Mining Division, and as but very little work had been done since Clothier made a very full and comprehensive report, it is not necessary to repeat the particulars in the present one, beyond the statement that shipping facilities can be constructed at a reasonable cost, as the ore-bodies are very easy of access. Apparently the ore-bodies are of considerable extent and occur as metamorphic-contact deposits.

Knight Inlet Section.

The Knight Inlet section of Nanaimo Mining Division embraces all of the country between Knight inlet and the summit between it and Seymour inlet. The entrance to Knight inlet is about forty miles south-easterly from the entrance to Seymour inlet, and it penetrates the Mainland in an easterly direction for about forty miles, and from that point in a northerly direction for nearly the same distance. It is the longest inlet between Vancouver and Queen Charlotte sound. At the head of Knight inlet the Klinaklini river flows in from a northerly direction. This river is about sixty miles long, having its source in a high range of mountains which forms the western boundary of the Chilcotin plateau and the eastern boundary of the Coast Range granodiorite batholith.

The Nanaimo Mining Division extends to the extreme headwaters of the Klinaklini river where it reaches the farthest point north in that Division.

Knight inlet bears all the characteristics that are noticeable in the other fiord-like inlets which penetrate the coasts of the Mainland and Vancouver island. Both shores are bordered by high mountains ranging from about 1,000 to 7,280 feet, which is the extreme summit of Mount Rodell at the easterly side of the inlet, a few miles from the head. There has been comparatively very little prospecting done in the mountains adjacent to Knight inlet on either side, the main reason being that there are so few places along the shore where small boats and launches can be anchored safely.

Glendale cove, about half-way up the inlet, at the point where its course changes from southerly to westerly, is about the only protected harbour in the entire inlet from Village island near its entrance from Queen Charlotte sound to the extreme head.

Knight inlet is included in the area of which a geological survey was made by J. Austen Bancroft, whose report is published in Memoir No. 23 of Canada Department of Mines, entitled "Geology of the Coast and Islands between the Straits of Georgia and Queen Charlotte Sound, B.C."

In that report Mr. Bancroft notes that the prevailing rocks belonging to the Coast Range intrusive are made up of granodiorite, granite, diorite, and gabbro, but in several points he notes that there are bands of undifferentiated rocks which include metamorphosed equivalents of the Marble Bay, Open Bay, Valdes, and Parson Bay formations.

It is, according to the experience of the writer, that at and near the contacts between the granodiorite and these metamorphosed bands are the most probable points where ore-bodies are likely to occur. Some of these bands of metamorphosed rocks have been prospected to some extent in the vicinity of Glendale cove, on the northerly side of the inlet.

Up to the present time there have only been two groups of mineral claims located on Knight inlet; these are known as *Princess* and *Union* groups.

Princess Group.

This group contains six mineral claims, known as the *Agnes*, *Margaret*, *Charlotte*, *Ethel*, *Jessie*, and *Mary*. The group is owned by the Princess Copper Mining Company, of Vancouver, of which John Walker, of Wallbridge & Walker, is the managing director. With the exception of the *Mary* mineral claim, which is located on the beach in a small cove, the other claims in the group are about two miles from the beach up the Matheson (Matsin) river. The mining camp is at an elevation of 1,500 feet and is reached by a good trail about a mile and a quarter long, and then by a poor trail about three-quarters of a mile up the precipitous mountain-side.

The Matheson (Matsin) river flows in a southerly direction between high precipitous mountains. It carries a considerable depth of water and has a fall of about 1,500 feet between the head and the mouth, where it flows into Knight inlet about six miles from and at the opposite side of the inlet from Glendale cove.

Geology.—The *Princess* group of mineral claims is located in one of the bands of metamorphosed rocks already mentioned, made up chiefly of crystalline limestone and such contact-metamorphic rocks as garnetite and epidote. This band of metamorphosed limestone occupies a zone of quite a considerable width, with granodiorite on either side.

Characteristics of Ore-deposits.—Within the zone of metamorphosed limestone there occur lenses of garnetite mineralized with copper ore, bornite predominating. The occurrences of ore are lenticular in structure, very irregular in occurrence, and so far as work that has been already done demonstrates are so erractic as to make any systematic development-work very difficult; in fact, a mining geologist should be in charge of the work in order to obtain the best results.

Development-work.—The development-work consists of a main adit driven into the mountain at an elevation of about 1,500 feet for a distance of 210 feet. The course of this adit ranges from east (mag.) to S. 55° E. (mag.), and the courses have been changed several times, so that the adit itself is quite crooked. At the time of the writer's visit to the property on July 13th, 1919, there was ore exposed in only one place in the adit, which was at a point 24 feet from the face, where in the floor there was an occurrence of mineralized garnetite with bornite disseminated irregularly through it. This lens of garnetite was about 3 feet wide and a sample chipped across it assayed: Gold, trace; silver, 1.4 oz.; copper, 0.9 per cent.

In the face of the adit there was another kidney or lens of mineralized garnetite about 6 inches wide, which indicated that possibly a pay-shoot of ore might be exposed by further work.

About 400 feet up the mountain-side at a 50-degree grade there was an open-cut and another adit 10 feet long driven for the purpose of intersecting a body of mineralized garnetite that outcropped about 20 feet higher elevation, but this work had not been carried far enough to prove successful.

About 50 feet in a southerly direction from the last-mentioned adit there is an outcrop of heavily iron-stained rock which appears to strike south-westerly, but the face of this outcrop is in an inaccessible position, as it occurs in a bluff with a vertical side; therefore this outcrop could not be examined by the writer, but from the tallus that has broken away from the bluff and is found in the slide below it would appear as though the iron-stained rock might possibly represent a capping that covered an occurrence of copper ore in a way similar to the occurrences of gossan found in many localities.

Another point where work has been done is about 12 feet from the portal of the main adit near the entrance to the open-cut approach to that adit. At this point occurrences of copper ore occur about 3 feet wide exposed by an open-cut about 5 feet deep, a sample from which assayed: Gold, trace; silver, 1 oz.; copper, 2 per cent.; zinc, 24 per cent.

In the writer's judgment the indications of the *Princess* group of mineral claims are sufficiently promising to warrant further work being done, but in order to accomplish satisfactory results the work should be under the supervision of a mining geologist who has had considerable experience in working in the contact-metamorphic ore-deposits on Texada island.

Union Group.

This group contains several mineral claims owned by the Union Copper Mining Company, Limited, of Vancouver, of which D. Campbell, of 503 Pender street, Vancouver, is the managing director. The group is located on the northerly side of Knight inlet and about ten miles in a northerly direction from Glendale cove, opposite Adeane point.

Geology.—There is on the *Union* group of mineral claims a belt of metamorphosed sedimentary rocks of blackish colour heavily iron-stained and having slaty structure, which occurs

as an inclusion in the granodiorite batholith, and has not been either carried off by erosion or destroyed by the intrusion of the granodiorite. This belt or band of altered sedimentaries outcrops on the beach and strikes north-west conformably with the strike of the contact between it and granodiorite, which is well defined, dipping about 50 degrees towards the north-east.

Reference to Bancroft's geological map of the mainland coast shows a series of similar belts of his "undifferentiated" rocks occurring towards the south-east on both shores of Loughborough inlet, both shores of Phillips arm, at Owen point in Cardero channel, as well as on the north-east part of Sonora island, in some of which locations occurrences of copper-sulphide ores have been discovered, some of which are described under the proper heading later in this report.

Characteristics of Ore-deposits.—So far, the work done on the *Union* group of mineral claims has failed to expose any occurrence of a deposit of mineral that can be classed as "ore." Four samples were taken at various points where quartz occurred, which carried cubes of iron pyrite disseminated through them. In the field these occurrences of mineralized quartz-lenses appeared promising, but when the samples were assayed the results were disappointing, being in each case: Gold, trace; silver, trace; copper, *nil.*

Development-work.—The quantity of development-work that has been done, considering the discouraging results from assaying, is remarkable, and indicates that either properly systematized sampling was neglected during the progress of the work, or that the management, in continuing the development, exhibited a degree of optimism that at least was unwise, as there is no exposure of ore anywhere in the workings.

The development-work consists of a main adit driven about 280 feet long with a crosscut 54 feet long from a point 37 feet from the face of the main adit; also an open cut at a point about 400 feet higher than the main adit, which is 50 feet above low water. There is a good cabin on the beach, as well as a blacksmith shop near the portal of the adit.

Harbledown Island.

As reports of the discovery of graphite on the south-westerly end of Harbledown island had been frequently brought to the attention of the writer during the past season, he visited that island on July 15th, 1919, and made an examination of the occurrence of the so-called graphite-deposit.

Harbledown island is in Johnstone strait, on the southerly side of and near the entrance to Knight inlet. This island has a maximum length of about eight miles and a maximum width of about three miles.

Geology.—The prevailing rock formation on Harbledown island, especially on the northerly side, is granodiorite and belongs to the Coast Range intrusive. On the southerly side there is a wide belt of volcanic rocks with intercalated beds of limestone, classified by Bancroft as the "Valdes" group, while a part of the south-westerly corner of the island is made up of metamorphosed carbonaceous shales, argillites, impure limestone, calcareous sandstones, and quartzites, classified by Bancroft as forming the "Parson Bay" group.

It is in the last-named formation that two prospectors (the Fyfe Bros.) have located mineral claims and sunk a shallow shaft on the beach, which was full of water and covered with boards when the writer examined the claims. The shaft is sunk in an outcrop of graphitic schistose rock, a sample of which assayed 0.5 per cent. graphite.

Phillips Arm Section.

The Phillips Arm section of the Nanaimo Mining Division includes the mountainous country adjacent to Phillips and Frederick arms, which are situated north of Thurlow island and are two comparatively small inlets between Bute inlet and Loughborough inlet. Phillips and Frederick arms are about 130 miles north-westerly from Vancouver.

Phillips arm figured from 1896 to 1901 as one of the active mining camps on the mainland coast when several mineral claims were located, and during 1898 and 1899 the section was brought into special prominence because of the operations at the *Doratha Morton* mine, where about 15,000 tons of ore was crushed and treated by cyanide process, which yielded $90,000 in gold and silver bullion. The mine was then closed down. Until 1916 there was no activity in mining in the Phillips Arm section. During 1916 a syndicate composed of George Golby and associates, of Victoria, commenced development-work on the *Amethyst* mineral claim in Fanny bay, on the west side of Phillips arm. This work was continued during 1919, but, with that exception,

no mining was carried on in the section. The *Blue Bells* claim on Frederick arm was bonded to the Ladysmith Smelting Corporation, which proposes to use the ore for a flux.

Amethyst Group.

This group contains two mineral claims known as the *Amethyst* and *Pathfinder*. The *Amethyst* group is on the northerly side of Fanny bay, off Phillips arm, and connected with a sheltered cove on Phillips arm, where there is good anchorage, by a road about a quarter of a mile long which crosses the southerly part of the adjoining *Monte Cristo* Crown-granted mineral claim, owned by H. W. Treat, of Seattle, Wash., that was worked in 1901, but has been idle since.

Accessibility.—The *Amethyst* group of mineral claims is easily reached from Vancouver by travelling on one of the Union Steamship Company's vessels to the regular port of call at Shoal Bay, at the north-easterly end of Thurlow island, from which point the *Amethyst* group is easily reached by rowboat or launch.

Geology.—The rock formation on the *Amethyst* group of mineral claims belongs to Bancroft's "undifferentiated" group, including metamorphosed "Marble Bay," "Open Bay," "Parson Bay," and "Valdes" formations, with the "Marble Bay" limestones predominating. The limestone has been intruded by several dykes, and ore-deposits have apparently developed as replacement deposits in the limestone, usually close to a dyke, so that it would appear as though the dykes influenced the deposition of the ore.

Characteristics of Ore-deposits.—The occurrences of ore appear to belong to the contact-metamorphic type, although in the immediate vicinity of the ore there is not exposed any contact between the limestone and granodiorite of the Coast range, but the "undifferentiated" metamorphosed rocks occur as an inclusion in the batholith. The gangue in which the ore occurs is chiefly quartz.

Development-work.—The development-work was started on the *Monte Cristo* claim close to the westerly boundary-line of that claim, which is the easterly boundary of the *Amethyst* claim. The work consists of a series of open-cuts which were made on to the *Amethyst* claim from the *Monte Cristo*. There is also a shaft said to be 30 feet deep on the *Amethyst* claim, which was sunk several years ago, and is at present mostly filled in and cannot be examined until cleared out.

It is reported by G. F. Monckton, who has had charge of the development-work during 1918 and 1919, that there is approximately 94 tons of sorted ore in the bunker on the beach, which he estimates will yield at least 5 per cent. copper in addition to low gold and silver values.

THURLOW ISLAND SECTION.

Thurlow island is separated from the mainland by Cardero channel and lies southerly from Phillips and Frederick arms. During 1898 and 1899 the island was the scene of considerable mining activity owing to the development-work being carried on at the *Douglas Pine* mine on the island and the near-by *Doratha Morton*, *Alexandra*, *Blue Bells*, and *Colossus* properties.

Shoal Bay settlement, at the north end of Thurlow island, was the distributing centre for the several mining and logging camps in the neighbourhood on account of its being the only regular port of call in that part of the Coast for the steamers which plied northerly from Vancouver via Euclitaw narrows. Since about 1902 there has been no activity in the mining industry, either on Thurlow island or in the neighbourhood, until 1919. Then the Ladysmith Smelting Corporation, Limited, acquired the *Dawn* group of mineral claims on the north-easterly part of the island and bonded the *Blue Bells* group on Frederick arm. This action encouraged some old-timer prospectors, who were familiar with the locality, to resume prospecting. These men were scattered through the Thurlow Island section at the time of the writer's visit in July, 1919. He purposed visiting the sections later in the year if any important discoveries were made, but was unavoidably prevented from so doing.

Dawn Group.

This group contains three mineral claims—*Dawn*, *Sunrise*, and *Sunset*—which were bonded by the Ladysmith Smelting Corporation, of Ladysmith, during the spring of 1919 from the locators, A. Prichard, of Shoal Bay, and associates. The group is located on the easterly side of Thurlow island about seven miles from Shoal Bay. The landing-point, from which a good trail to the mine-workings has been constructed about half a mile long, is in a small bay off Nodales channel, which separates Thurlow island from Sonora island, the northerly of the Valdes group of islands.

Geology.—The rock formation on the *Dawn* group of mineral claims is a rather wide band of Bancroft's "undifferentiated" rocks, which contact with the Coast Range granodiorite in the

mine-workings. On other parts of Thurlow island the prevailing country-rock is granodiorite or other of the rocks associated with it in the Vancouver group.

Characteristics of Ore-deposits.—The ore on the *Dawn* group occurs as a vein at the contact of the altered sedimentary rocks and granodiorite. The gangue in which the minerals occur is quartz and the mineralization so far as can be detected in the field is principally confined to iron pyrite, but there is also some chalcopyrite associated with the iron. The results from assaying average samples of the ore from the mine-workings show that most of the value is in gold and silver, but that the values are quite variable.

The quartz vein strikes N. 40° W. (mag.) and dips from 50 to 60 degrees towards the south-west (mag.), except at the face of a deep open-cut and in the face of the drift adit about 50 feet below the open-cut, where it appears that faulting has taken place and changed the dip to north-east (mag.) at about the same angle.

An average sample across 15 inches of the vein at the face of the drift-adit assayed: Gold, 1.8 oz.; silver, 8 oz.; copper, *nil*. Another sample grabbed from the dump at the collar of a shaft said to be 17 feet deep, but full of water, assayed: Gold, trace; silver, 0.4 oz.; copper, 1.31 per cent.

Development-work.—The development-work on the *Dawn* group of mineral claims on July 16th, 1919, consisted of a drift-adit 70 feet long, a deep open-cut about 50 feet higher elevation than the adit, and a shaft about 200 feet south-easterly from the portal of the adit.

Redonda Islands Section.

The Redonda islands form a group of two islands known as East and West Redonda. They are bounded on the north by Pryce channel, by which the islands are separated from the entrance to Toba inlet and the mainland, on the east by Homfray channel, on the south by the Strait of Georgia, and on the west by Lewis channel and Deer passage. West Redonda island is separated from the East Redonda island by Waddington channel.

To the present time there have been no discoveries of mineral-deposits reported on East Redonda island, but magnetite-iron ore was discovered on the northerly part of West Redonda island as early as 1892, when the *Elsie* mineral claim was located. In 1893 a shipment of about 600 tons of magnetite was made to the Oswego Iron and Steel Company's furnace in Oregon and in 1895 the claim was Crown-granted. Later the *Eagle* and *Black Warrior* mineral claims were staked easterly from the *Elsie* and sufficient work done on them to obtain a Crown grant. Since then until the late fall of 1918 there has been no mining development on the island, except quarrying limestone at a point about half a mile easterly from the north-east corner of the *Elsie* mineral claim. This enterprise was closed down several years ago.

After the passage of the "Iron-ore Supply Act, 1919," the writer visited West Redonda island twice, the first time during April, 1919, and the second time during the following May, in order to examine the mineral claims and estimate the cost necessary for transportation facilities and development-work to ship iron ore to smelters for experimental treatment.

The north shore of West Redonda island is very precipitous; there are no beaches, sheltered coves, or anchorages where vessels could lie safely in the neighbourhood, except on the opposite or north side of Pryce channel.

Black Warrior Group.

This group contains twelve mineral claims—*Coast Iron*, *Coast Iron No. 1*, *Iron Bluff*, *Iron Mountain*, *Eagle*, *Black Warrior*, *Iron*, *Iron Cliff*, *Bonanza*, *Homestake*, *Tidewater*, and *Tidewater No. 1*. The *Black Warrior* group, which is owned by the Redonda Iron Copper Company, Limited, is staked in such manner that the *Elsie* mineral claim is surrounded, except on the north, where it extends to the water-front, being bounded on the east by the *Iron Bluff* mineral claim, on the south by the *Iron Mountain* mineral claim, and on the west by the *Coast Iron No. 1* mineral claim. All of the claims in the *Black Warrior* group, except the *Iron Mountain*, *Black Warrior*, *Eagle*, and *Homestake*, are staked along the shore-line. The north-west corner of the *Eagle* claim is also on the shore, but the north-east end line extends into the mountains in a south-easterly direction.

Geology.—The rock formation along the bold shore is for the most part porphyritic granodiorite to the west of the *Bonanza* claim, where there is a well-defined contact between the igneous rock and a much-altered limestone. The line of the contact strikes in a south-westerly direction up the precipitous mountain-side and is so well defined as to form quite a prominent landmark.

Characteristics of Ore-deposits.—The occurrences of ore on the *Black Warrior* group are magnetite-deposits and occur at the junction of the *Eagle* and *Black Warrior* claims, also on the *Homestake* claim. The first-mentioned occurrence of magnetite outcrops on the easterly steep bank of a torrential stream which is named Eagle creek and flows for most of its length through deep box canyons. A portion of the outcrop, which is 14 feet wide, occurs on the *Black Warrior* claim; the remainder on the *Eagle* claim. The ore-body appears to fill a fissure in a shear-zone of igneous rock. It could not be followed along its strike because the surface above the cliff in which the outcrop occurs is so densely covered with underbrush and timber as to cover up and hide all rock formation. Apparently the ore-body is striking south-westerly and dipping north-easterly about 85 degrees. A sample across 14 feet wide assayed: Iron, 64.8 per cent.; phosphorus, trace; sulphur, trace; silica, 5 per cent.; titanium, *nil.*

The ore-body referred to as occurring on the *Homestake* mineral claim could not be examined because the canyon in which it is reported to outcrop was full of snow at the time of the writer's visits, and although a serious attempt, by climbing up the snowslide for about 500 feet, was made to reach the point where the outcropping was reported to occur, the covering of snow was too deep for any examination to be made. This reported occurrence is about half a mile by a switchback trail from the shore and at an elevation of about 1,500 feet above sea-level, and in an easterly direction from the occurrence of magnetite on the *Black Warrior* and *Eagle* claims.

Development-work.—The development-work on the *Black Warrior* group of mineral claims consists of some stripping, open-cuts, and an adit 10 feet long in the steep bank of Eagle creek at the junction of the *Black Warrior* and *Eagle* claims, also stripping and open-cuts on the *Homestake* claim. In addition to this work, good trails have been constructed from the beach near the north-west corner of the *Eagle* claim to all of the mine-workings and outcroppings, except for the last 600 feet to the showing on the *Homestake* claim, where it was practically impossible to construct a trail along the precipitous mountain-side; consequently travelling is done up the steep bed of a deep canyon.

Elsie. This mineral claim was Crown-granted in 1895 and is at present owned by the estate of the late John Hendy, of Vancouver. The claim is located on the north shore of West Redonda island. The north-east corner is on the shore about 1,400 feet westerly from the north-west corner of the *Eagle* claim of the *Black Warrior* group, already described in this report. About 600 feet westerly from the north-east corner there is a small bay or cove into which the water from a mountain stream flows from a southerly direction through deep box canyons.

Geology.—In Bancroft's description of the rocks exposed on the shore-line on the *Elsie* claim, he states that they "comprise a porphyritic granodiorite which shades off into a light-grey hornblende granite, both of which include patches of massive darker rocks which are very rich in hornblende and which undoubtedly represent highly altered portions of the roof beneath which these batholiths cooled. Upon the shore-line of this property there is a patch of dark rock extending for a distance of about 120 feet which contains a few fragments of altered crystalline limestone." At an elevation of about 450 feet above sea-level and distant only about 700 feet southerly from the shore there occurs a belt of metamorphosed limestone which contacts with a light-grey hornblende granite. The limestone is so much altered as to make any classification in the field very difficult, but the contact is well defined and encloses a wide body of magnetite ore which apparently replaces some of the altered limestone.

Characteristics of Ore-deposits.—The occurrence of magnetite ore on the *Elsie* mineral claim is reached after climbing an almost perpendicular mountain-side to a vertical elevation of about 450 feet. The ore occurs as a contact-metamorphic type of deposit, which is apparently striking in a southerly direction and dipping vertically, but further development may show that the direction of the strike is incorrect.

The deposit of magnetite is exposed in a large open-cut or quarry about 50 feet wide from east to west, about 40 feet high at the face, and about 20 feet from north to south. About 30 feet of the width from east to west is practically pure magnetite, with the remaining 20 feet magnetite mixed with some enclosures of country-rock. A grab sample from the face of the open-cut or quarry assayed: Iron, 60.6 per cent.; phosphorus, trace; sulphur, trace; silica, 10.9 per cent.; titanium, *nil.*

Development-work.—The development-work on the *Elsie* mineral claim consists of the open-cut just mentioned, from which the shipment of about 600 tons of magnetite that was shipped to

Valdes Island Copper Co.—Copper Mountain Mine.

Valdes Copper Co.—Dump at Beach, Ingersoll Mine.

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Oregon in 1893 was mined. There are also some remains of an ore-chute from the quarry to the beach, and bunkers, but in such a state of dilapidation as to require rebuilding, as it would be impossible to repair either the chute or bunkers.

Quantity of Ore.—It is impossible to make any estimate of the quantity of magnetite in the deposit until further work is done, because the only exposure is the face of the open-cut or quarry, and the rock-surface, both down and up the mountain, is hidden by slide-rock, timber, and underbrush.

Quadra Island Section.

Quadra Island section of the Nanaimo Mining Division comprises the area occupied by the Valdes group of three islands named Quadra, Maurelle, and Sonora. Quadra, the most southerly, is the most important as well as much the largest; Sonora, north of Quadra, is next in size; Maurelle, west of Quadra, is the smallest of the group of islands. A narrow channel which extends from Discovery passage west of the islands to Hoskyn inlet, the most northerly branch of the Strait of Georgia, separates Quadra from the other two islands, while a much narrower channel named "Hole in the Wall" separates Sonora island from Maurelle.

Up to the present time no discoveries of mineral-deposits have been reported on either Sonora or Maurelle islands. According to Bancroft's report and map, Memoir No. 23, Geological Survey of Canada, these two islands are made up almost entirely of Coast Range intrusive rocks, with granodiorite predominating, except a small area in the north-east corner of Sonora island, where a narrow belt of metamorphosed sedimentary rocks occur.

From a mining standpoint the centre portion of Quadra island is the most important and the only part of the island that has produced any ore of commercial value. This portion of Quadra island is bounded on the north and east by the contact between the Coast Range intrusives and crystalline limestone of the "Marble Bay" formation, which extends across the central part of Quadra island, from Granite bay on the west side of the island, in a south-easterly direction to Open bay on the south-east shore. On the south the productive part of the island is bounded by the contact between the "Valdes" formation, comprising greenstone, andesite, basalt, and glacial recent sand, gravel, and clay of the Quaternary period, which extends across the southern part of Quadra island from Quathiaski cove on the south-west side to Heriot Bay on the south-east shore. The north-west and south-west boundary of the productive portion is Discovery passage, of which Seymour narrows is a part.

The ores which occur in the central part of Quadra island are for the most part copper sulphides, with bornite predominating, also some chalcocite and a little native copper.

During the season of 1919 there have been only two mineral properties on Quadra island at which any mining operations have been carried on. These are the *Copper Mountain* (or *Ingersoll*) and *Santa Anna* groups of mineral claims, both of which have been fully described in former Annual Reports of the Minister of Mines; therefore in this report will only be briefly mentioned, as follows:—

Copper Mountain Group.

The *Copper Mountain* (or *Ingersoll*) group of mineral claims contains fifteen Crown-granted mineral claims owned by the Valdez Island Copper Company, Limited; head office, Hibben-Bone Building, Victoria. The property extends in a north-westerly direction from the head of Gowlland harbour, on the south-westerly shore of Quadra island, for a distance of about two miles and a half.

Development-work.—During a part of 1919 development-work was done by Thomas Kerruish, who shipped about 300 tons of copper ore under a lease from the company, which expired late in the summer. Since then the company has been preparing to resume the work.

Kerruish extended the open-cut work for about 40 feet long on the *Senator* claim at a point about 4,000 feet from the southerly end of the property, and exposed a continuation of the ore-body about 4 feet wide for that distance from the southerly face of the open-cut made in 1918. The open-cut is about 8 feet deep, and at the southerly face a well-defined fault occurs, which appears to have changed the strike of the ore several degrees to the west. The fault-plane dips vertically, and the ore-body is apparently continuing along the fault and also dipping vertically. A large proportion of the shipment made in 1919 was mined from the open-cuts on the *Senator* claim. A grab sample from the dump assayed: Gold, trace; silver, trace; copper, 3.5 per cent.

On the *Ingersoll No. 2* claim, which adjoins the *Senator* on the south, an open-cut 60 feet long, 10 feet wide, and 6 feet deep, which nearly crosscuts the country-rock, but follows the

strike of an ore-body, was made across the summit of a high bluff. In this open-cut the ore exposed is chiefly bornite.

About 300 feet southerly from the bluff just mentioned and in the bank of the creek an ore-body is exposed, made up chiefly of chalcocite. This ore occurs along a fault-plane dipping vertically and striking nearly east (mag.). The occurrence was recently discovered and where exposed the ore is 18 inches wide.

On the *Copper Mountain* mineral claim, near the north-westerly end of the property, there are several large open-cuts and a shaft, said to be 30 feet deep, but not examined because it was full of water, and no facilities were handy to unwater it. A sample from an open-cut about 40 feet westerly from the shaft assayed: Gold, trace; silver, 0.4 oz.; copper, 3.2 per cent. Another sample from an open-cut about 30 feet easterly from the shaft assayed: Gold, trace; silver, 0.4 oz.; copper, 4.9 per cent. The width of ore exposed in the last-named open-cut is about 11 feet.

Santa Anna Group.

This group contains six mineral claims known as the *Santa Anna*, *Eureka*, *Green Meadow*, *San Lucas*, *Lucky Jack*, and *Happy Chance*, owned by Jack McConville, George Broadhurst, J. Danaher, and T. Tarmoody, of Vancouver. The group is located about a mile and a half northerly from Bold point, a prominent landmark on the south-easterly shore of Quadra island about ten miles northerly from Heriot Bay, which is the regular port of call for steamers plying the channels to the easterly from Quadra island. A good road connects the mine-workings with a wharf in a small cove near Bold point.

Geology.—The rocks on the *Santa Anna* group are chiefly metamorphosed limestones which contact with granitic rocks having a gneissic structure. The line of contact is well defined and has a general north-westerly strike. The belt of limestone occurring on the *Santa Anna* group appears to be isolated from the main lime-belt, which crosses Quadra island from near Bold point to Granite bay.

Characteristics of Ore-deposits.—The occurrences of copper-sulphide ore on the *Santa Anna* group are apparently lenticular in structure and belong to the contact-metamorphic type of ore-deposits. The ore occurs usually immediately at the contact between the limestones and granitic rocks. For a distance of about 700 feet in a north-westerly direction outcroppings of chalcopyrite, associated with pyrrhotite and iron pyrite, occur. These outcroppings are not stripped sufficiently to demonstrate continuity along the line of strike, consequently are only exposed at isolated spots where the outcroppings occur as low bluffs. Samples taken from an open-cut about 300 feet north-westerly from the main adit assayed: Gold, trace; silver, 2.4 oz.; copper, 3.1 per cent. The mineralization where this sample was taken is about 12 feet wide, but the sample is not an average across the entire width.

The main mine-workings are in a high bluff where ore-outcroppings can be followed up the face of the bluff in a south-easterly direction for about 200 feet on an incline of nearly 45 degrees. Below the outcroppings an adit has been driven 100 feet long with the expectation of exposing the ore-body that outcrops on the surface in the face of the bluff at deeper levels, but a well-defined fault appears to have interfered with the continuity of the ore, so that beyond 20 feet in the adit from the portal no more ore is seen. A sample from across an open-cut about 25 feet higher elevation than the portal of the adit, and about 60 feet distant, assayed: Gold, trace; silver, 2 oz.; copper, 3.4 per cent. Another sample from a dump near the portal of the adit, which represented ore sorted for shipment, assayed: Gold, trace; silver, 3.8 oz.; copper, 6.6 per cent.

Development-work.—The development-work on the *Santa Anna* group consists of two adits, several open-cuts, surface-stripping, and the construction of an ore-chute 220 feet long on a 40-degree incline and small bunkers and loading-platform for shovelling ore into wagons. The length of one adit is about 100 feet and of the other about 120 feet.

West Side of Quadra Island.

Extending from near Bold point across Quadra island to the west side near Granite bay there occurs a wide belt of crystalline limestone which occurs between Coast Range intrusive rocks on the north-easterly side and volcanic rocks of the "Valdes" formation on the south-westerly side. Several years ago this section was prospected to some extent and high-grade ore was discovered at some points, notably on the *Lucky Jim* group of mineral claims about five miles

from the boat-landing on Granite bay. There has, however, been no activity in mining or prospecting in the section since the war started in 1914.

From all the indications and the results of prospecting in the past, it would appear that this portion of Quadra island should offer quite an attractive field for prospectors in the future. Although in the interior of the island transportation facilities are lacking, yet the construction of such is a comparatively easy proposition; in fact, there is a graded road-bed of an old logging-railroad extending for about five miles from Granite bay which passes very near the *Lucky Jim* mine-workings, and could be made use of by the expenditure of a moderate amount in case any mineral claims possessing promise and merit were located or if the *Lucky Jim* mine was reopened.

Texada Island Section.

During 1919 there has been about the same activity in mining on the northern part of Texada island as has been the case in that section for several years past. A little more attention has been paid to prospecting on the island than during 1918 and a few new locations have been made.

The southern portion of Texada island has never been prospected to any extent, but since several logging camps have been running in the vicinity of North-east point, on the easterly coast of the island, and as roads and trails are gradually being extended towards the vicinity of Davies bay, it is possible that some prospectors will in future prospect south-easterly in the vicinity of Mount Davies and farther towards the south-east end of the island.

The *Marble Bay* mine has been a regular shipper during 1919. The *Nigger Baby* mineral claim on the north-westerly part of the island was purchased during 1919 by Harvey Wells and associates, of Tacoma, Wash., from C. R. Miller. This was one of the early locations made on the island several years ago when the discovery of narrow quartz veins in the porphyrite, which occurs as the predominating country-rock in the north-western and south-easterly parts of Texada island, created considerable excitement.

There has been no activity in any of the properties owned by the Vananda Copper and Gold Company near the *Marble Bay* mine, but late in 1919 a bond was taken on these properties by the Calumet-Arizona Mining Company, and work is to be started in the near future unwatering the old mine-workings and extending them.

It was expected that after the passage of the "Iron-ore Supply Act, 1919," there would be quite a demand made by owners of the several small electric furnaces in and near Vancouver for a supply of magnetite ore, some of which would have been mined from the deposits on Texada island, but owing to litigation, in which the furnace companies became involved, the demand for magnetite ore for experimental purposes was limited to one small shipment.

Marble Bay. This mine was visited on October 4th and 5th, 1919, when the progress in development-work made since the writer's visit on November 8th, 1918, was examined. In the Annual Report of the Minister of Mines for 1918, pages 275-277, a full description of the conditions on the 1,600-foot level is published.

Development-work.—During 1919 sinking the incline winze from the 1,600-foot level was continued. This winze starts from the 1,500-foot level near the north-westerly face of the long drift on that level. The winze is sunk 365 feet altogether on a 45-degree incline. The 1,600-foot level is 125 feet on the incline below the 1,500 foot level, and at 210 feet below the 1,600-foot level a station is made called the 1,700-foot level. This level is 1,610 feet vertically below the surface outcroppings at the main shaft and about 1,550 feet below the sea-level. The winze is sunk 30 feet below the 1,700-foot level. A diamond-drill station has been made on the west side of the winze about 15 feet below the 1,700-foot level, from which holes were being bored during the examination in order to prospect the ground laterally as well as to deeper levels. That point was selected for boring because, in sinking the winze on a 45-degree incline, it passed into the hanging-wall of the ore-body mined to the west of the winze on the 1,600-foot level; consequently it was advisable to prospect the ground under the floor of the winze, and at the point selected there was a lens of ore about 5 or 6 feet wide exposed on the west side of the winze. A sample from this exposure assayed: Gold, 0.7 oz.; silver, 0.5 oz.; copper, 2.8 per cent.

The winze from the 1,600- to the 1,700-foot level passed through the following series of rocks: 65 feet limestone, with bunch of ore on west side; 10 feet limestone; 5 feet quartz diorite; 1 foot garnetite; 30 feet igneous dyke (this dyke is 12 feet wide where it can be measured at a right angle to the dip, but the winze intersected it diagonally); 2 feet ore; 5 feet garnetite; 92 feet

limestone. The ore exposed on the west side of the winze below the 1,700-foot level was underhand-stoped for about 15 feet deep.

At the bottom of the winze, on October 5th, 240 feet below the 1,500-foot level, the formation is badly shaken up and the dip is south-easterly instead of westerly, as is the case on the upper levels. The rocks are limestone, garnet, quartz diorite, black slickensided rock, apparently an igneous intrusive, with a narrow lens of ore enclosed in limestone garnet gangue. A sample of this ore assayed: Gold, 0.72 oz.; silver, 0.5 oz.; copper, 2.8 per cent.

Shipments.—During 1919 the shipments of ore made from the *Marble Bay* mine were mined partly from the stope above the 1,600-foot level and the remainder from stopes between the upper levels, some of which had not been entirely mined out. The stope between the 1,500- and 1,600-foot levels is 65 feet high to its highest point above the 1,600-foot level and 40 feet high minimum, 70 feet long, and an average of 8 feet wide.

Red Robin. This mineral claim is owned by W. S. Planta, of Vananda, and is located about two miles southerly from Vananda, near the main road from Vananda to the iron-mines, and on the west side of that road.

Geology.—A contact between the Marble Bay limestone and Texada porphyrite rocks occurs to the west of the *Red Robin* mineral claim. The strike of the limestone appears to be east (mag.) and dips to the south, but no definite angle could be determined from the exposures because of the many fissures and shear-planes. The limestone is crystalline. In addition to the fissuring of the limestone, it is also cut by occasional diorite-porphyrite dykes. The fact that garnet and other secondary minerals do not occur in such quantity accompanying the metallic minerals, as is the case on the principal properties in the limestone formation on the island, is quite noticeable. Iron pyrite, chalcopyrite, some galena and blende are the metallic minerals occurring on the claim, and these are disseminated through the limestone.

Development-work.—There is a shaft, said to be 60 feet deep, which could not be examined because of being nearly full of water, also several open-cuts made on outcroppings of ore in the limestone.

Samples.—One sample taken from an open-cut about 200 feet easterly from the No. 1 post assayed: Gold, trace; silver, 0.6 oz.; copper, 2.4 per cent. Another sample selected from the dump at the collar of the shaft assayed: Gold, 0.24 oz.; silver, 6.8 oz.; copper, 5.5 per cent.

Nigger Baby. This claim is one of the older locations near the centre of Texada island, where a discovery was made of a gold-bearing quartz vein occurring at the contact between a much-altered limestone and the Texada porphyrite formation. The claim was owned by C. R. Miller, of Vananda, until 1919, when he sold out to Harvey Wells and associates, of Tacoma, Wash.

The claim was examined on October 4th, 1919, but little information could be obtained, because all of the older workings, consisting of several open-cuts and a shaft, said to be about 25 feet deep, were filled with water and debris, and the new work, consisting of a crosscut adit 75 feet long, had not been driven far enough to intersect the mineralized zone on which the shaft is sunk. The earlier work is along a ridge about 60 feet higher elevation than the level of the crosscut adit.

Prospecting has been done for about 300 feet in a general N. 60° W. (mag.) direction along the ridge where several outcroppings of gossan occur. These yielded colours in gold from panning, and the shaft mentioned was sunk at the point where the best values occurred.

It is proposed by the new owner to continue the crosscut adit in order to prospect the ground. The adit is driven in a S. 40° W. (mag.) direction. For 30 feet it is driven through porphyrite; next through a band of lime-silicate rock very much altered, 12 feet wide; then through porphyrite for 23 feet, where lime-silicate rock again occurs, and continues for 10 feet or to the face at the time the examination was made.

At the face of the adit a little mineral in the form of iron pyrite occurs disseminated in the lime silicate, but not in sufficient quantity to sample. It would appear, though, to be an indication that the face of the adit was near the contact on which the shaft mentioned earlier has been sunk.

STRATHCONA PARK SECTION.

Buttle Lake Subsection.

During the summer of 1919 there was a good deal of activity in the vicinity of Myra and Price creeks, at the head of Buttle lake, where about thirty mineral claims were recorded in

addition to the *Black Bear* group, referred to by the writer in the Annual Report of the Minister of Mines for 1918, page 268. This activity resulted from the report that Joseph Errington, consulting engineer for the Temiskaming Mines Corporation, had bonded the *Black Bear* group for his company.

A visit to this section had been arranged, but this had to be cancelled owing to the writer being called on to make an examination of the iron-ore deposits in the Taseko (Whitewater) River section on the Mainland; consequently the trip to Buttle lake had to be postponed until 1920.

Both Price and Myra creeks, which flow into Buttle lake near the head, rise in the high range of mountains north-westerly from the Big Interior mountain. The summit of this range forms the backbone of Vancouver island and marks the dividing lines between the Nanaimo, Alberni, and Clayoquot Mining Divisions. The waters from these mountains flow in torrential streams towards the north, west, and south. The waters flowing towards the north empty into Buttle lake; thence into the Campbell lakes, Campbell river, and into Discovery passage, near Seymour narrows, on the east coast of Vancouver island. The waters flowing towards the south empty into Great Central lake; thence into Stamp river and the Sumas river into Alberni canal, at its head, on the west coast of the island. The waters flowing towards the west empty into Bear river, which flows into Bedwell sound, one of the largest arms of Clayoquot sound.

The geographical location of the headwaters of Price and Myra creeks is interesting, because there is a possibility of an extension of the mineralized zones which occur in the vicinity of Big Interior mountain, reaching that part of the range of mountains in which the two creeks rise.

Buttle Lake subsection is at present handicapped by lack of transportation facilities for hauling heavy machinery or ore, but it is easy of access for prospectors and others who travel light. These is an auto-road for about twelve miles or so after leaving Campbell River settlement, and beyond the end of the auto-road there is a pack-trail to the foot of Buttle lake. The total distance by road and trail is about thirty miles and Buttle lake is about twenty miles long.

There has been no other noticeable activity in mining or prospecting in other sections of the Strathcona Park section of the Nanaimo Mining Division during 1920.

Comox Section.

The Comox section of the Nanaimo Mining Division includes the comparatively narrow strip of Vancouver island contiguous to the east coast southerly from Campbell river to North-west bay, a distance of about seventy miles, together with Denman and Hornby islands, which are in the channel off Baynes sound between Vancouver and Texada islands. The area is known as the Comox coal-basin. It is separated from the Nanaimo basin by an axis of the Vancouver volcanics which occurs in the vicinity of North-west bay. The extreme north-westerly boundary of the Comox coal-basin is about six miles northerly from Campbell River settlement in the neighbourhood of Duncan and Menzies bays, outside of that portion of Vancouver island known as the Esquimalt & Nanaimo Railway concession. No mining operations are at present being carried on in that part of the Comox coal-basin.

The mining activity in the Comox section is confined to coal-mining in the vicinity of the town of Cumberland by the Canadian Collieries (Dunsmuir), Limited. The details of these operations are included in the reports of the Inspector of Coal-mines; consequently it is unnecessary to repeat in this report.

It is deemed advisable by the writer to call attention to the new work which has been carried on by the Canadian Collieries (Dunsmuir), Limited, during 1919. This consists of prospecting the territory, adjacent to the Tsaable river, which empties into Baynes sound about five miles southerly from Union Bay and opposite Denman island. In connection with this prospecting thirteen miles of wagon-road have been built and diamond-drill holes aggregating about 7,000 feet have been bored.

Within a comparatively short distance south-westerly and westerly from the town of Cumberland there occurs the Beaufort range of mountains, which forms the backbone of Vancouver island and is made up for the most part of rocks belonging to the Vancouver group, consisting chiefly of metamorphosed basic volcanic rocks, often with bands and lenses of limestone, usually fully crystalline, and argillites occurring as intercalations in the volcanics.

So far as can be ascertained, there has been very little systematic prospecting for metalliferous minerals done in this range of mountains in the Comox section of the Nanaimo Mining

Division, although it is only a comparatively short distance across the mountain range to the occurrences of copper-sulphide ores in the Buttle Lake subsection of the Nanaimo Mining Division on Myra and Price creeks, and the line of the Canadian National Railway is surveyed along the south shore of Comox lake en route from Alberni canal to Cumberland.

NANOOSE SECTION.

The Nanoose section of the Nanaimo Mining Division includes that part of the Division tributary to Nanoose bay, on the east coast of Vancouver island. The mining activity in this section is confined to the operations of the Nanoose-Wellington Coal Company, which succeeded the Nanoose Collieries Company, Limited, during August, 1919, and operates the Grant mine.

So far as at present known, the only mineral resource of the Nanoose section is the occurrence of the extreme north-westerly extension of the Wellington or lowest coal-seam in the Nanaimo coal-basin, as both the upper or Newcastle and Douglas seams are lacking. These seams are not found to the north-westerly from Newcastle island, about eight miles south-easterly from the Grant mine.

Nanoose-Wellington Coal Co.

This company has its headquarters at 1010 L. C. Smith Building, Seattle, Wash., also at 607 Standard Bank Building, Vancouver. The officers of the company are: President, Louis Williams; secretary-treasurer, John A. Coleman; general manager, Frank H. Lantz; mine manager, John Johns, who has occupied the same position since 1917, or soon after the mine was opened. The property of the Nanoose-Wellington Coal Company is known as the Grant mine. It includes the Jack and Hinchman estates in Land Lot No. 27, also Land Lot No. 37, and four foreshore leases extending south-easterly four miles along the shore-line from a point a short distance north-westerly from Blunden point.

Geology.—The Wellington coal-seam on this property occurs between a sandstone floor and conglomerate roof. The sandstone is presumably Clapp's "East Wellington" sandstone, which is the usual floor of the seam. The conglomerate is apparently Clapp's "Extension" conglomerate. Such a roof is unusual with the Wellington seam; according to Clapp, "The roof of the seam varies, yet it is most commonly a sandy shale, carbonaceous and coaly in places." He only reports one other part of the Wellington seam where the roof is conglomerate; that is near Extension, at the farthest point south-easterly where any coal-mining has been done on that seam.

In structure the coal-seam in the Grant mine conforms with the usual structural characteristics of the Wellington seam at other points where mines have been opened, near the contact of the volcanic rocks with the coal-measures—namely, at Harewood, Wakesiah Farm, East Wellington, and Extension. The thickness of clean coal varies considerably, but the coal is of an excellent quality and carries as low a percentage of ash as any of the Vancouver Island coals.

Development-work.—The Grant mine is worked on the pillar-and-stall system. Since the coal rights on Land Lot No. 37 east of and adjoining Land Lot 27 have been secured through a lease from the Canadian Collieries (Dunsmuir), Limited, work on the slope that was being driven in a northerly direction under the sea from the bottom of the main shaft has been suspended, and the main East level and counter-level have been driven about 1,800 feet in 1919. These levels have opened a section of the coal-seam to the eastward, not before prospected by working-openings that are producing good coal. This work has also demonstrated that there is an anticlinal fold through the westerly part of the basin, and that on the top of the fold itself the coal is thin, but on the dips from the top of the fold the width of clean coal increases, and in the easterly part of the field now being developed the results are more satisfactory.

New Equipment.—The installation of a new surface plant has just been finished, so that in future the tipple, screens, belt-conveyors, and washer will have a capacity sufficient to handle 500 tons of coal a day. The plant consists of: Two return-tubular boilers, each 125 horse-power; one 750-foot Canadian Ingersoll-Rand compressor; one 150-kw. electric generator from Ross Engineering Works, Amherst, Nova Scotia; one electrically driven centrifugal pump for coal-washery and fire-protection, capacity 450 gallons a minute; two storage-tanks for coal-washery and fire-protection, capacity 25,000 gallons; one Elmore coal-washing plant, equipped with jig-washer, screening plant, picking-table, loading-boom, and bunkers for three grades of coal. The entire plant operated by electricity. One new office building; one stable to accommodate twenty head of horses; one power-house 46 x 52 feet.

There is bunker capacity for 1,000 tons of lump coal, rendered necessary because there is no well-sheltered harbour in the vicinity of the property; consequently when tugs tow scows to the wharf it is imperative to always have sufficient coal in the bunkers to load the scows with the least possible delay.

Each separate unit in the plant is operated by an individual motor. The coal is delivered from the mine-cars into a bin equipped with automatic feed, by which the coal is fed into a shaker-screen tipple. From the tipple the lump coal passes over a steel belt-conveyor about 20 feet long, so arranged that by lowering a section of it lump coal can be transferred directly into the cars, in which it is carried to the wharf and loaded into vessels or scows. If it is desired to carry the coal to the storage-bunkers, the movable section of the conveyor-belt is switched to one side, where it connects with a second steel belt-conveyor about 90 feet long built lengthwise over a bunker with capacity to store 1,000 tons. The last-named belt-conveyor is arranged so that it discharges from any one of the several sections or at the end, so that different grades of coal can be dumped into the bunkers under the belt and stored separately, or can be carried the entire length of the belt and dumped at the end.

The slack and nut coal which passes through the shaker screen is carried in an elevator to a bin near the top of the plant, from which it is discharged into the Elmore coal-washer, where the coal is washed and sized and passes through chutes and elevators to storage-bin. From the washer the rock and waste pass through a chute to the waste-dump at the back of the plant.

During the winter a supply of fresh water for the washer is secured from a spring on the property, stored in two tanks, with a capacity of about 25,000 gallons, from which it is drawn by gravity to the washer. During the summer months sea-water is pumped into one of these tanks and used in the washer.

Nanaimo Section.

The Nanaimo section of the Nanaimo Mining Division includes that part of the Nanaimo coal-basin between Departure bay on the north and Ladysmith harbour on the south. Within these boundaries are the collieries operated by the Canadian Western Fuel Company, known as the No. 1 or Esplanade shaft, Protection Island, Harewood, Reserve, and New Wakesiah mines; the collieries operated by the Canadian Collieries (Dunsmuir), Limited, known as the Extension Colliery and No. 5 mine at South Wellington; the Morden mine, about two miles easterly from South Wellington, operated by the Pacific Coast Coal Mines, Limited, and the Granby No. 1 Colliery at Cassidy, operated by the Granby Consolidated Mining, Smelting, and Power Company.

Each of the above-mentioned collieries is described in detail in the Inspector of Coal-mines' report in this Annual Report of the Minister of Mines; consequently the remarks by the writer will be very brief.

Two new producers are the No. 5 mine at South Wellington, the property of the Canadian Collieries (Dunsmuir), Limited, from which coal has been mined on a commercial scale since early in 1919, and the Wakesiah mine on the Wakesiah farm, the property of the Canadian Western Fuel Company, Limited, which began producing commercially about October, 1919.

Amongst new development or prospecting work to be recorded for 1919, there is the reopening of an old slope by the Canadian Western Fuel Company, Limited, on the Wellington seam southerly from the Harewood mine. The slope had been driven about 700 feet and abandoned by the former management. During the past summer the old workings were unwatered and examined, with the result that the general manager, George A. Bowen, ordered that the workings be reopened and extended and the mine placed on a producing basis. This may be worked as the Harewood No. 2 mine with a new railway connection, or the underground workings may be extended to connect with the haulage system on the Harewood mine and the coal be transported through that mine to the railway system now in use.

Some diamond-drilling was done by H. W. Treat, of Seattle, Wash., on a foreshore lease near the mouth of the Chemainus river during the spring of 1919, but has been suspended. In this connection it is interesting to note that the title to several foreshore leases obtained by Mr. Treat was attacked in the Courts by the Esquimalt & Nanaimo Railway Company, carried to the Privy Council in 1919, and the suits won by Treat.

The labour conditions in the coal-mines on Vancouver island have been excellent during 1919; the relationship between the companies and their employees was so harmonious that, despite the efforts made by some of the radical leaders in the Vancouver strike, it was found impossible to promote any discord in the Island collieries. A system of collective bargaining was introduced

after the big strike in 1914, by which the miners working for each company elect committees by a pit-head ballot from amongst the employees in the particular mines operated by the respective companies, which committees act as advisory and conciliatory boards between the miners and the company. In this way each individual company treats with its own employees, and new contracts were signed last fall satisfactory to all.

LADYSMITH SECTION.

In the 1918 Annual Report of the Minister of Mines the section now described under the above heading was considered under the heading of "Nanaimo River subsection of the Strathcona Park section," but the above is considered the most appropriate.

The boundary between the Nanaimo and Victoria Mining Divisions is a short distance south of the town of Ladysmith, and the Ladysmith section of the Nanaimo Mining Division embraces a comparatively narrow strip of country extending westerly from the coast of Vancouver island to the headwaters of the South fork of the Nanaimo river.

During recent years there has been but very little prospecting in this section of the Nanaimo Mining Division, but in the early history of the Division the country in the westerly part of this section was prospected to a considerable extent and several mineral claims were staked. Chief amongst these are the *Jubilee*, *Paterson*, and *Allies* groups, all of which are mentioned in the 1918 Annual Report of the Minister of Mines.

The present inactivity in the section is due mainly to the fact that it lies within the Esquimalt & Nanaimo Railway Belt, and that company has title to all coal and base metals occurring in the belt, leaving only the precious metals under the control of the Provincial Government. Under the Dunsmuir regime a fairly good arrangement could be made by locators of mineral claims within the belt, but under the present control of the Esquimalt & Nanaimo Land Grant, presumably the Canadian Pacific Railway Company, no arrangement considered to be equitable by prospectors can be perfected.

As no occurrences of ore carrying gold and silver values exclusively have been discovered in the Esquimalt & Nanaimo Railway Belt, there is no incentive to prospectors to explore within its boundaries unless an equitable arrangement can be made with regard to the copper values.

Lack of transportation facilities into this section of the Nanaimo Mining Division is another reason for inactivity in mining operations. There are three routes by old trails by which the section can be reached at present. One route is by way of Cowichan lake to the mouth of Cottonwood creek; thence up that creek to the headwaters of the North-west fork of the Chemainus river, and from there on to the divide between the North-east fork of Cottonwood creek and the headwaters of the South fork of the Nanaimo river, a distance of about twelve miles from Cowichan lake. Another route is from Ladysmith via the old Rineheart trail to the headwaters of the West fork of the Chemainus river near where it forms a junction with the trail from Cowichan lake. The third route is from Nanaimo via the wagon-road up the South fork of the Nanaimo river to the city dam across that river; thence by trail to the *Jubilee*, *Paterson*, and *Allies* groups of mineral claims, a distance of about thirty miles from Nanaimo, and across the mountains, where there is no trail, towards Cowichan lake, a further distance at present undetermined.

During the summer of 1918 the writer visited the groups of mineral claims mentioned, travelling the route from Nanaimo, and during June, 1919, he endeavoured to reach the same section to examine the *Mountain Ash* and *Silver Leaf* mineral claims, owned by Thos. Service, of Riverside, Cowichan lake, travelling via Cowichan Lake and Cottonwood Creek trail, but because of the depth of snow on the divide between the North-east fork of Cottonwood creek and the head of the South fork of the Nanaimo river was unable to make an examination. A sample obtained from Service, said to have been taken from a vein on the *Silver Leaf* mineral claim, assayed: Gold, 1.16 oz.; silver, 1.5 oz.; copper, 15.2 per cent.

The Ladysmith section of the Nanaimo Mining Division is recognized as important, because in it is located the copper blast-furnace of the Ladysmith Smelting Corporation, Limited, formerly the Tyee Copper Company's plant. This smelter has been closed down since 1912, except for a short time during the summer of 1917, after the present owners purchased the plant. There is a prospect, the writer is informed by officials of the company, that the smelter may be blown in during 1920, as the company has developed the *Girdwood* mine, also known as the *Blackbird*,

on Latouche island, Prince William sound, Alaska, up to a shipping stage, and claims a large tonnage of copper-sulphide ore blocked out available for early shipment.

The company has during the past year acquired several mineral claims on Mount Sicker in addition to the Tyee mining property there, on which it has a crew of miners working; also the *Blue Bells* group of mineral claims on Frederick arm near Thurlow island, in Nodales channel, about 120 miles north-westerly from the smelter-wharf near Ladysmith.

VANCOUVER MINING DIVISION.

The Vancouver Mining Division occupies an area on the Mainland, as well as several small islands directly tributary to the city of Vancouver. The northern boundary follows the Coast range from north of the head of Jervis inlet south-easterly to Green lake, near Mons Station, on the Pacific Great Eastern Railway; the eastern boundary adjoins the western boundary of the New Westminster Mining Division and generally follows an irregular line southerly from Green lake to the head of Burrard inlet; the southern boundary is the North arm of the Fraser river and the coast-line of the Strait of Georgia to Point Grey, and thence to the west side of Jervis inlet, a distance of about thirty-five miles from Vancouver City; and the western boundary follows the watershed between Jervis inlet and Powell lake.

So far as metalliferous lode-mining is concerned, the Vancouver Mining Division is by far the most important Division in the Western Mineral Survey District, by reason of the fact that the *Britannia* mine is within its boundaries, and the further fact that its distributing centre is the largest city in the Province, which naturally attracts many mining men, as well as brokers and some prospectors.

In the Annual Report of the Minister of Mines for 1918, on pages 290-296, several prospects situated in the different sections of the Vancouver Mining Division were described by the writer. There has been but comparatively little activity in prospecting during 1919 in the Division, with the exception of the vicinity of Mount Diadem near Britain river, which empties into Jervis inlet at the north end of Prince of Wales reach, and on the westerly side of Howe sound.

On the properties described in the 1918 Report the usual assessment-work has been performed during 1919, but no extensive development-work has been reported; consequently it is unnecessary to repeat the descriptions in the present report.

Britannia Belt Section.

Britannia.

The Britannia Mining and Smelting Company, Limited, has continued during 1919 pursuing its progressive policy of the past with regard to new development-work in the mines, and although, when the final results of the production during the year were definitely ascertained, the figures did not reach those given in Bulletin No. 1, 1919, Provincial Bureau of Mines, "Preliminary Review and Estimate of Mineral Production, 1919," yet the production is satisfactory when the scarcity of water resulting from an unusually dry summer is considered, together with the uncertainty in the market and fluctuations in prices. As compared with 1918, the monthly averages in prices in cents per pound for electrolytic copper in New York are shown in the following table, taken from the *Mining and Scientific Press* of San Francisco:—

Monthly Averages.

	1918.	1919.
January	23.50	20.43
February	23.50	17.34
March	23.50	15.05
April	23.50	15.23
May	23.50	15.91
June	23.50	17.53
July	26.00	20.82
August	26.00	22.51
September	26.00	22.10
October	26.00	21.66
November	26.00	20.45
December	26.00	18.55

The *Britannia* mine was visited during the latter end of October, 1919, when the information contained in the following report was obtained.

Britannia Beach.—There have been several improvements made in the camp at Britannia Beach, the most important being the tearing-down of the old concentrating and vanner building and the erection of a recreation-hall building, 36 feet wide by 72 feet long, of two stories. On the second floor of this building is a large dance-hall, which is also used for moving-picture entertainments. On the first floor is a very modern billiard-hall, furnished with an English billiard-table and three pool-tables, also a barber-shop. This building was erected at the expense of the company, and illustrates in a practical way the interest the company shows in the welfare of its employees.

Development-work.—In the main adit or tunnel, with its portal near the grizzly floor of the concentrating-mill, there has not been much progress during 1919. This adit is driven 4,221 feet long, 9 feet high, 13 feet wide, with an upraise 12 x 7 feet, started at a point 4,053 feet from the portal, where a station 15 x 10 x 9 feet has been made. The upraise is 100 feet high, but will eventually reach the 2,700-foot level, and will then be over 1,300 feet high, as it is being driven on an incline, or the difference between 250 feet above sea-level, the elevation at the portal, and about 1,550 feet above sea-level, the elevation at the 2,700-foot level. The various levels are measured from the summit of the outcroppings at the glory-hole downwards instead of from sea-level upwards.

New work is on the 3,100-foot level, where an adit is driven 659 feet, with a crosscut 325 feet, prospecting for suitable ground for the upraise from the 4,100-foot or main adit level to be made through to the 2,700-foot level. This adit is 400 feet below the level of the upper terminal of the incline tramway. In addition to prospecting for ground for upraise, the adit and crosscut will also prospect ground heretofore unexplored at depth.

On the 2,700-foot level, near the head of the incline tramway, the crosscut adit known as the Armour crosscut has been driven in a southerly direction 502 feet to October 24th, 1919. This adit is 10 feet wide by 12 feet high.

The productive mine-workings are at present reached from the main haulage level, known as the 2,200-foot and being about 2,100 feet above sea-level. The adit on this level is 4,712 feet long, 9 feet high, by 13 feet wide. It is equipped with electric haulage and connected with the levels above by a vertical raise reaching to the 1,000-foot level; from that level direct connection is made by a vertical raise to the 500-foot, which is connected with the 250-foot level by another vertical raise.

The three raises mentioned are equipped with hoists and cages for transporting men, timbers, and supplies only. The mined ore is transported by passing down a series of rock-raises and transfer rock-raises to the crusher on the 1,800-foot level, and thence to the ore-bins on the 2,200-foot level. The economy of this system is recognized by the fact that about three-quarters of the ore mined is only handled once between the stopes and the main haulage level, while the remainder is only handled twice, so that the cost of transportation is minimized to the lowest possible figure.

In the present report reference will only be made to the development-work done during 1919, as the work done previous to that year is fully described in the Annual Report of the Minister of Mines for 1917, pages 271-275, and for 1918, pages 291-292. In describing the development-work in this report the mine-workings will be considered in descending order, starting from the glory-hole at the summit of Britannia mountain, about 4,300 feet above sea-level.

For convenience the *Britannia* mine is subdivided into four divisions known as the *Fairview*, *Bluff*, *Jane*, and *Empress* mines, all of which are connected by underground workings. The ore-bearing zones are called veins and numbered from 0 to 11, from N. to S., with 0 vein being the most northerly.

Fairview Mine.—The glory-hole covers an area of about 1,100 feet from W. to E. and 400 feet from N. to S., mostly on the *Fairview* mine, but a part of it on the westerly end extends on to the *Bluff* mine. The glory-hole working has practically levelled off the top of the mountain down to the 250-foot level. Ore is mined from veins Nos. 8 to 11 in this working. Northerly from the glory-hole surface work has been done on veins Nos. 4 and 6. The extreme width from vein No. 4 to vein No. 11 is 800 feet.

On the 250-foot level the veins worked are Nos. 4 to 11, inclusive, and the work done during 1919 aggregates 600 feet of drifts, 300 feet of crosscuts, and 400 feet of raises. The raises were

made to draw the ore mined from the glory-hole when, because of the great depth of snow that accumulated in it, some ore was mined by stoping up from the 250-foot level instead of by quarrying. Some of the ore so mined was passed down a rock-raise to the 500-foot level, the remainder to the 850-foot level, and about three-quarters of the tonnage was only handled once before it reached the crusher on the 1,800-foot level; the remainder was only handled twice in transit to the crusher.

On the 500-foot level the veins exposed are from veins Nos. 3 to 11. Above this level all of No. 3 vein has been left for pillars. Stopes above the 500-foot level up to the 250-foot level are on veins Nos. 4, 5, 6, 7, 9, 10, and 11, with most of the work done on veins Nos. 9, 10, and 11, on the main hanging-wall side of the mineral-bearing zone, which dips about 75 degrees to the south. The work done during 1919 on the 500-foot level aggregates 400 feet of drifts, 100 feet of crosscuts, and 1,500 feet of raises.

The stopes above the 500-foot level to the 250-foot have up to the present time been one of the most productive sections of the mine, and the continuity of the No. 5 vein above the 500-foot level has been almost phenomenal, as shown in the Brandon stope, which is 1,300 feet long by 35 feet wide. The stope on the No. 9 vein is 500 feet long, but the vein has been drifted along on the 500-foot level for a distance of 1,150 feet. The stopes on veins Nos. 10 and 11 on the 500-foot level are amalgamated into one stope 650 feet long by 30 feet wide.

The ore stoped from above the 500-foot level is dropped to bins in the 1,000-foot level by a system of transfer rock-raises. From the bins the ore is transported by an electric train to the top of the No. 68 or main rock-raise, down which it is dropped to the crusher floor on the 1,800-foot level.

On the 600-foot level there are stopes on veins Nos. 3, 4, 5 foot-wall, 5, 6, 7, and 10. Between No. 5 foot-wall and 5 there is a barren zone averaging about 20 feet wide, but the No. 5 foot-wall vein does not continue below the 600-foot level. The work done on the 600-foot level during 1919 has been 125 feet of crosscuts and 200 feet of raises. The following is a synopsis of work being done in the stopes between the 600- and 500-foot levels, together with the general dimensions: Stope on No. 3 vein, robbing pillars, stope 450 feet long by 30 feet wide; stope on No. 4 vein measures 120 feet from W. to E. by 15 feet wide; stope on No. 5, robbing pillars, stope measures 600 feet long; stope on No. 6 vein measures 120 feet W. to E. by 20 feet wide; stope on No. 7 vein, robbing pillars, stope measures 200 feet long by 35 feet wide. On No. 10 vein prospecting-work was done and the vein was exposed about 50 feet below the 500-foot level.

On the 850-foot level there are stopes on veins Nos. 3, 4, 5, 6, and 7. The development-work done during 1919 on the 850-foot level has been 200 feet of crosscuts and 300 feet of raises. On the No. 3 vein the stope is 450 feet long by 30 feet wide. This stope has now been carried through to the 600-foot level. On No. 4 vein the work has been robbing pillars in the stope, which is 750 feet long by 15 feet wide. The stope on No. 5 vein measures 400 feet W. to E. by 30 feet wide; the stope on No. 6 vein measures 480 feet W. to E. by 20 feet wide; the stope on No. 7 vein measures 700 feet W. to E. by 25 feet wide.

On the 1,000-foot level there are stopes on veins Nos. 1, 3, 4, 5, 6. The development-work done during 1919 on the 1,000-foot level is 50 feet of drifts, 200 feet of crosscuts, and 300 feet of raises. On the No. 1 vein the stope is 150 feet from W. to E. and work of robbing the pillars has been carried on during 1919. The stope on No. 3 vein is 400 feet long W. to E. by 15 feet wide; the stope on No. 4 vein is 750 feet long W. to E. by 20 feet wide; the stope on No. 5 vein is 450 feet long W. to E. by 20 feet wide; the stope on No. 6 vein is 600 feet long W. to E. by 27 feet wide. All stopes, except those on Nos. 3 and 6 veins, are opened through to the 850-foot level. No. 8 vein is not exposed below the 1,000-foot level.

On the 1,200-foot level veins Nos. 1, 3, and 5 have been drifted on and vein No. 7 has been exposed in crosscutting to the south. No. 1 vein is drifted on for 400 feet and raises made preparatory to stoping. No. 3 vein is 1,150 feet long from W. to E. and 30 feet wide. Below the 1,200-foot level veins Nos. 3 and 4 amalgamate. Vein No. 5 is 700 feet long on the 1,200-foot level and about 15 feet wide. No stoping has yet been done on this vein above the 1,200-foot level, but during 1919 chutes have been cut, aggregating 400 feet, preparatory to beginning to stope.

On the 1,400-foot level during 1919 there has been 270 feet of crosscuts driven south from vein No. 3 to No. 5 vein, and crosscutting is being continued to expose veins Nos. 6 and 7.

On the 1,600-foot level during 1919 there has been 650 feet driven on No. 5 vein to the easterly from the *Fairview* mine to complete connection from the main shaft to open air in south valley. The total length of this tunnel is one mile.

On the 1,800-foot level the drift on the No. 3 vein has been advanced 260 feet during 1919.

On the 2,000-foot level the drift on No. 2 vein has been advanced 150 feet during 1919.

Bluff Mine.—This mine is westerly from the *Fairview*, which it adjoins. The name is derived from the fact that the earliest development-work done on the *Britannia* group was on what is now known as the 1,000-foot level, where the surface is a comparatively flat bench from which rises a precipitous bluff, called by the miners the "Mammoth" bluff. The precipitous northerly slope of this bluff showed considerable mineralization, being heavily stained by the oxidization of iron pyrite, associated with which there occurred sufficient chalcopyrite in a siliceous gangue to make a valuable body of concentrating-ore. A long adit driven into the bluff in 1900 crosscut diagonally an extensive body of this ore.

Until within a few years ago the 1,000-foot level was the main haulage level, the site of the chief mine camp and upper terminal of the aerial tramway; but since the 2,200-foot level has been developed and made the main haulage level, upper terminal of the electric railway, and the site of the chief mining camp, comparatively little attention has been paid to the "Mammoth" bluff until within the past two years, for the reason that the *Fairview* mine has been the principal productive part of the property above the 1,000-foot level. Since then a glory-hole has been opened on the "Mammoth" bluff, an average height of 125 feet above the 1,000-foot level, 200 feet long from W. to E. and 90 feet wide. The ore from this glory-hole is delivered on the 1,800-foot level at the crusher by one handling. The product is approximately 300 tons a day.

On the 1,200-foot level in the *Bluff* mine three stopes have been opened during 1919, with pillars between them. These are known as the foot-wall, centre, and hanging-wall stopes for convenience. The foot-wall stope is 450 feet long by 60 feet wide, the centre stope is 300 feet long by 50 feet wide, and the hanging-wall stope is 150 feet long by 40 feet wide. Raises are being made from which to work the stopes on the shrinkage system. The hanging-wall stope only reaches to a vertical height of about 150 feet above the 1,200-foot level, where the hanging-wall country-rock is exposed.

The total development-work in the *Bluff* mine done during 1919 consists of 1,500 feet of drifts, 450 feet of crosscuts, and 2,000 feet of raises. This work is all between the 1,600- and 1,000-foot levels. The 1,600-foot level is the lowest opened in the *Bluff* mine.

Jane Mine.—This mine adjoins the *Bluff* on the west. The earliest work done on the original *Britannia* group of mineral claims was on the *Jane* claim, consisting of that done by the prospectors who staked the claims in 1898 and did prospecting-work on the 1,000-foot level. During 1919 all the work in the *Jane* mine has been done on the 1,200-foot level. This consists of 150 feet of drifts and 400 feet of raises.

Empress Mine.—The portion of the *Britannia* property known as the *Empress* mine comprises the original *Empress* group of mineral claims in the territory known as South valley, drained by the waters of Furry creek, which empties into the east side of Howe sound about three miles southerly from Britannia Beach.

The *Empress* mine-workings are connected with the workings on the other mines described above by a series of drifts on the 500-, 1,000-, and 1,600-foot levels, that on the 1,600-foot level measuring one mile in length. This new connection on the 1,600-foot level was completed during 1919, when 660 feet of it was driven. From this main drift the management purposes making crosscuts to develop the ore-bodies in the *Empress* mine, which have a general strike N. 70° W. and dip from 60 to 65 degrees to the south.

The work done in the *Empress* mine during 1919 is confined to the 850-, 1,000-, 1,200-, and 1,600-foot levels.

On the 850-foot level, at an elevation of 3,500 feet above sea-level, no new development-work was done in 1919, but stoping on No. 2 vein was continued. This stope is 250 feet long, 30 feet wide, and 110 feet high, but has not been driven through to the 700-foot level, which is 120 feet above the 850-foot level, or 3,620 feet above sea-level.

On the 1,000-foot level veins Nos. 1 and 2 are being stoped. No. 1 vein stope is 230 feet long and 20 feet wide; No. 2 vein stope is 260 feet long and 40 feet wide.

On the 1,200-foot level an ore-body is being developed by a diagonal drift 900 feet long, 650 feet of which has been driven during 1919. There are also 400 feet of crosscutting from the portal which overlooks South valley to the diagonal drift.

Outside work in the South Valley part of the *Britannia* property consists of the *Victoria* tunnel, driven 45 feet in 1919, and diamond-drill boring to the east, but on the *Victoria* mineral claim. The diamond-drilling exposed an ore-body heretofore unknown, estimated by J. W. D. Moodie, the general manager, as containing approximately 3,000,000 tons of ore of commercial value by concentration that can be classed as "actual" ore, developed by diamond-drilling.

Mr. Moodie, in describing this work and the results, is of the opinion that the strike of the main ore-body in the *Empress* mine may have been diverted into the valley of the West branch of Furry creek on to the *Victoria* mineral claim. The ore-body occurs under a heavy overburden of gravel and debris, so that diamond-drilling was the only practicable method of determining its occurrence.

Driving on the Hillside crosscut adit west of the *Jane* mine is being continued to prospect ground on the same level as the 1,000- foot on the *Jane*. This adit was driven 600 feet during 1919.

In the foreging summary of the measurements of raises made during 1919 the footage driven in stopes for ventilation and exits are not given, because such measurements are included in the dimensions of the stopes.

During 1919 the Britannia Company shipped several hundreds of tons of gypsum from the *Fairview* mine. This mineral is associated with the Britannia schist-zone. It was discovered on the 1,000-foot level in the *Fairview* workings, more than 500 feet easterly of the glory-hole and northerly from any known copper-ore bodies. The gypsum was first exposed in the Mammoth bluff adit about 700 feet from the portal. The stope from which the gypsum was mined is 50 feet long and 30 feet wide.

Water-power.—There has been practically no change of note in the water-power plants during 1919. Some ditching has been done to supplement the intake on Furry creek from Marion lake. The several storage-reservoirs have fully demonstrated their usefulness, because during the dry season in the autumn these reservoirs saved the day. The total water horse-power under use at present is 6,000.

Indian River Properties.—The Britannia Mining and Smelting Company has expended about $75,000 during 1919 in the purchase and development of properties acquired in the vicinity of Indian river, about twelve miles easterly from Britannia Beach. Some adits were driven and diamond-drilling for prospecting was carried on, but all of this work has been suspended since peace was declared, because of the excessive cost for labour and supplies and the decreased price of copper, together with the uncertainty of demand.

Ore Reserves.—The tonnage of ore reserves in the *Fairview*, *Bluff*, *Jane*, and *Empress* mines, exclusive of the ore-body recently discovered on the *Victoria* mineral claim, is reported by the management as being 9,000,000 tons of "actual" ore, averaging 2 per cent. in copper, in addition to low gold and silver values. No estimate is made of ore reserves that may be considered as "probable" and "possible," but have only been exposed by diamond-drilling.

Pacific Great Eastern Section.

The section of the Vancouver Mining Division described as the Pacific Great Eastern includes the territory traversed by the Pacific Great Eastern Railway from Squamish, the terminal at the head of Howe sound, to the divide between Alta and Green lakes, about 40 miles from Squamish.

This section, together with several groups of mineral claims, was described in the Annual Report of the Minister of Mines for 1918 on pages 293-296; therefore in the present report reference will only be made to the mineral claims examined during September, 1919, which were not included in the 1918 Report.

Bruce Group.

This group consists of four mineral claims—*Bruce*, *Bruce No. 1*, *Bruce No. 2*, and *Bruce No. 3*. The group is owned by Duncan McKinnon, D. A. McKinnon, G. D. Martin, and D. McCallum, of Vancouver. The property is located in the mountains at an elevation of about 3,000 feet. The claims are a short distance back from the Staamus river on the easterly side, about five miles above its mouth at the head of Howe sound. Ray creek, a tributary of the Staamus, flows through the group of claims in a deep box

canyon nearly its entire length of about three-quarters of a mile, in which it falls about 1,400 feet. The *Bruce* camp is on Ray creek at an elevation of about 1,200 feet above sea-level.

Geology.—The prevailing rocks on the *Bruce* group of mineral claims and vicinity are schists occurring in a belt about one mile wide and of undetermined length. The line of strike is in a north-westerly direction nearly parallel to the course of the narrow Staamus River valley, and the dip is 68 degrees to the south-west. This schist-belt is apparently surrounded by granodiorite of the Coast batholith intrusion. The schists are very much metamorphosed and mineralized to a very considerable extent, principally with iron pyrite, with which is associated some chalcopyrite.

Characteristics of Mineral-deposits.—The mineralization in the schists is so generally distributed through the entire width of the belt and shows such low values that the difficulties and expense of thoroughly prospecting for zones of enrichment must of necessity be great. Several open-cuts made in the belt of schist at points varying from about 1,500 to 3,000 feet above sea-level were examined and sampled by the writer, but assays of these samples failed to show any commercial values.

McKinnon Group. This group consists of nine mineral claims owned by Duncan McKinnon and associates, of Vancouver. The group is located along the Staamus valley, one claim (or 1,500 feet) wide and nine claims (or 13,500 feet) long, nearly parallel to the course of the Staamus river. Two of the claims in the *McKinnon* group are located between the river and the *Bruce* group already described.

Geology.—The belt of schists which occurs on the *Bruce* group is found to extend over on to the *McKinnon* group. The contact between the granodiorite of the Coast batholith and the schists is well defined on Ray creek on the *Maud* mineral claim, one of the *McKinnon* group.

Characteristics of Mineral-deposits.—The mineralization in the schists consists chiefly of disseminations of iron pyrite, chalcopyrite, and a little zinc-blende. Similar conditions to those surrounding the occurrences of mineral on the *Bruce* group of mineral claims are found on the *McKinnon* group. The future value of these properties rests on the results from thoroughly prospecting the belt of schists with a view to finding, if possible, a zone or zones of enrichment, where the values have been so concentrated as to be sufficiently high to yield satisfactory results on a commercial scale.

Several samples taken from open-cuts and short adits, which represent assessment-work, when assayed failed to yield satisfactory values.

West Side of Howe Sound Section.

Ever since the success of the operations by the Britannia Mining and Smelting Company has been assured, efforts have been made by prospectors to locate a westerly extension of the Britannia mineral-belt adjacent to the west side of Howe sound, but up to the present time these efforts have not been followed by any marked degree of success. The country is a very difficult one to prospect thoroughly owing to heavy growth of underbrush, precipitous cliffs, deep gulches and canyons that are practically impassable owing to the almost vertical sides.

From time to time reports are given out relative to the discovery of so-called extensions to the Britannia belt, but up to the present time there have not been any material results apparent or any discoveries made that have proved sufficiently attractive to capitalists to encourage any to invest sufficient money to develop such claims as have been staked.

The latest proposition to receive attention is a group of claims located by a prospector and miner named Mike Johanson on a small creek named McDonald creek, about five miles in a south-westerly direction from Britannia Beach, which was examined by the writer on March 22nd, 1920.

Horseshoe Group. This group contains twelve mineral claims—*Horseshoe*, *Horseshoe No. 2*, *Horseshoe No. 3*, *Horseshoe No. 4*, *Horseshoe No. 5*, *Horseshoe No. 6*, *Frank*, *John*, *Joe*, *Tom*, *Viva*, and *Viva No. 2*—owned by Mike Johanson, who lives on the property, and associates. The group is staked from the beach on Howe sound back into the mountains to the vicinity of Mount Ellesmere for a distance of about 7,500 feet, or the length of five claims. Along the beach there is a tier of three claims staked from south to north; to the west of and adjoining these claims there is another tier of three claims, followed up the creek by three tiers with two claims each. The claims are reached by travelling in a westerly direction a good but steep trail across three claims and a part of a fourth, where work on the

trail had ceased within about the length of a claim from a steep bluff which in appearance somewhat resembled the Mammoth bluff on the *Britannia* property previous to any development having been done on it.

Geology.—There is a belt of schists and altered argillites occurring on the property with its line of strike in a westerly direction, and apparently this belt extends through three or four of the claims in that direction, but its width is at present undetermined. On both the north and south sides the belt of schists, some of which are micaceous, is flanked by granodiorite of the Coast batholith.

Characteristics of Mineral-deposits.—There are two prominent outcroppings of mineralized schist on the group of claims so far as has been exposed to date. One of these is on the *Joe* claim, the third claim westerly from the beach, through which McDonald creek flows. The outcrop occurs at an elevation of about 1,400 feet above sea-level and about 500 feet in a northerly direction from McDonald creek. A sample was taken from a small open-cut in the bluff, which assayed: Gold, trace; silver, trace; copper, trace.

The mineralization occurs at the contact between granodiorite and micaceous schist. The outcrop is made up of iron-stained schist, in which occur lenses of quartz carrying iron pyrite, pyrrhotite, and apparently some chalcopyrite. It is impossible to form any estimate as to the extent of the mineralization until more work is done.

Another outcropping that is heavily iron-stained and evidently mineralized with iron pyrite occurs on the *Horseshoe* claim, which adjoins the *Joe* on the north-west. This outcrop can be seen from a point about half a mile distant. It forms a prominent landmark, and the reddish colour resulting from the oxidation of iron pyrite in the gangue tends to make the bluff in which the outcrop occurs more conspicuous, as well as giving it some resemblance to the Mammoth bluff on the *Britannia*.

The outcropping could not be examined closely because the trail had not been built to it, and the writer had no guide to show the way through the dense forest-growth nor time to cruise out a trail. As he was reliably informed that no work had been done on the outcropping, but little information could have been obtained from an examination, as samples from the weathered face of the bluff would not have proved satisfactory so far as ascertaining an average value of the mineralized rock.

Bowen Island Section.

Bowen island was visited by the writer on March 23rd, 1920. It is situated at the entrance to Howe sound, and although considerable prospecting has been done on it, chiefly around the shore, and quite a number of mineral claims located and Crown-granted, there is at present only one group being operated. This is on the east coast of the island and known as the *Emerald* group of mineral claims, owned by the Bowena Copper Mines Limited, Company, of Vancouver, of which Charles M. Oliver is the managing director. The property is being worked under a lease by Clarence W. Tipping, of Vancouver.

Emerald Group.

This group of mineral claims contains the *Emerald* and *Emerald No. 1.* Both of these are Crown-granted. The prevailing rocks in the vicinity of the *Emerald* group of mineral claims belong to the Vancouver series of volcanics, which are very much sheared, fractured, and fissured. Intruding into the volcanics are some well-defined igneous dykes, classified by Victor Dolmage, of the Geological Survey of Canada, as fine-grained, light-grey, quartz porphyry.

Characteristics of Mineral-deposits.—Copper minerals occur as deposits similar to those described by Clapp in Memoir No. 13, Canada Department of Mines, 1912, page 176, and classified as the Sooke type of deposit with "disseminated chalcopyrite in shear-zones." The deposits, of which there are two occurring nearly parallel to each other, have a vein-like structure, are from 8 to 10 feet wide, and can be traced on the surface for some considerable distance. The walls are fairly well defined. The general line of strike of the veins is about N. 35° W. and dip about 80 degrees to N. 55° E.

The ore-bodies for convenience are designated as the "shaft" and "adit" veins. These veins occur within a distance of about 100 feet from each other. The "adit" vein has been the most extensively developed. It outcrops in the face of a precipitous bluff overlooking deep water. An adit has been driven in a N. 55° W. (mag.) direction 230 feet. From near the portal copper ore is exposed in the roof of the adit for a distance of 75 feet, at which point a sample was taken

across 7 feet. From that point for about 75 feet there is no ore exposed in the adit, but in a crosscut driven towards the south-west (mag.) from the adit, and at the point of junction, the vein-matter which was sampled is about 10 feet wide. Apparently the adit is driven parallel to the vein for about 75 feet, or for the distance between the points sampled. From the junction of the adit and crosscut the former is driven about 80 feet, with no ore exposed, to the face, where there is a narrow stringer of ore. The crosscut beyond the part sampled at its junction is driven about 50 feet long in barren country rock. This was done with the intention of intersecting the "shaft" vein on the same level as the adit, or about 125 feet vertically below the outcrop of the vein, but has not yet been driven sufficiently far to accomplish the purpose.

A vein which is apparently the "adit" vein is exposed on the surface by an open-cut about 8 feet deep and 8 feet wide. The "shaft" vein is prospected by a shaft with drift at the bottom, which could not be examined because of being full of water. The shaft is said to be 30 feet deep and drift 10 feet long. A sample was taken from the dump at the collar of the shaft.

Assays.—Samples taken from point 75 feet in adit assayed: Gold, trace; silver, trace; copper, 0.3 per cent. Sample taken from point 150 feet in adit assayed: Gold, trace; silver, trace; copper, 0.4 per cent. Sample taken from collar of shaft assayed: Gold, trace; silver, trace; copper, 15.2 per cent.

Development-work.—The development-work in the mine consists of a main drift-adit 230 feet long, with a crosscut 50 feet long driven from it; a shaft reported to be about 30 feet deep, with drift at bottom, but not examined because full of water; and an open-cut about 8 feet deep north-easterly from shaft.

On the surface there is a milling and concentrating plant with an estimated crushing capacity of about 100 tons a day. This plant is equipped with a 120-horse-power boiler; engine; Eureka crusher, 10 x 12 inches; tube-mill, 6-foot Hardinge; set of six Mineral Separation cells and agitator for oil-flotation process; bins for ore and concentrates. The plant is erected on a bluff which forms the shore of Howe sound, where a vessel can load during calm weather, but with no shelter in case of storms.

The mill was being run on an experimental trial the day the examination of the property was made, and it is expected will be in continuous operation in future.

Snug Cove Copper Co.

The property of the Snug Cove Copper Company consists of several mineral claims which adjoin the property of the Bowena Copper Mines, Limited, on the north. The rock formation prevailing on the claims of the Snug Cove Copper Company is the Vancouver series of volcanics. In this occur several shear-zones which are being prospected by a crosscut adit that has been driven 160 feet without exposing any deposits of ore of commercial value.

Characteristics of Ore-deposits.—On the surface of one of the claims of the Snug Cove property, near the north line of the *Emerald* claim of the Bowena Copper Mines, Limited, there occurs an outcropping of copper-sulphide ore of the shear-zone type. This is exposed in an open-cut, and it is hoped that it will be intersected by the long crosscut adit just mentioned when that adit is driven somewhat farther.

Development-work.—The development-work consists of the crosscut adit mentioned, which has been driven 160 feet, with about 200 feet of backs at the present face of the adit. If driven about 80 feet farther, this adit should intersect the "adit" vein on the *Emerald* claim at a depth of about 270 feet below its outcropping, providing that vein maintains its continuity to such depth.

Opporcol Group.

This group contains several mineral claims owned by Thos. Newman, of Vancouver, and associates. The group is located on the easterly side of Howe sound, about five miles northerly from Whytecliff, the present terminus of that portion of the Pacific Great Eastern Railway built from North Vancouver through West Vancouver. For several reasons the writer has been unable to make an examination of this property, on which it is reported considerable development has been done during 1919; consequently no description is given in this report. Mention is merely made of the property to show that more or less attention is being paid to prospecting in the mountains on this side of Howe sound, southerly from the Britannia belt.

Attorney Group.

This group contains fourteen mineral claims—*Covenanter, Alastor, Attorney No. 6, Missing Link, Attorney No. 5, Attorney No. 4, Attorney No. 3, Attorney No. 2, Attorney No. 1, O.K., Canyon, Wedge Fraction, Orator,* and *Imperator*—

B.C. Manganese Co.—Upper Terminal, Tramway, Victoria M.D.

B.C. Manganese Co.—Quarry and Old Bunkers.

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owned by the Attorney Copper Gold Syndicate, of Vancouver. Wm. Savage, trustee; J. C. Fisher, superintendent. The group is located in the mountains adjacent to Alberta bay, east side of Howe sound, about half-way between Point Atkinson and Britannia Beach. The group is reached by a trail from Alberta bay. During 1919 some work is reported to have been done on this group, but it was not examined owing to the inability of the writer to arrange for an examination when the work was progressing, because of his absence in a distant part of District No. 6 at the time. Later he was unable to locate any guide to show him the property.

NEW WESTMINSTER MINING DIVISION.

The New Westminster Mining Division occupies an area on the Mainland roughly triangular in shape with a somewhat acute angle as the northerly boundary. The base is the International Boundary-line along the 49th parallel from the Strait of Georgia on the west to the summit of the Cascade range of mountains on the east. The easterly boundary follows that summit from near the head of Chilliwack lake to the line of the Lillooet Mining Division near Skookumchuck Indian village on the Lillooet river. The westerly boundary follows the summit of the Coast range of mountains from the southerly boundary of the Lillooet Mining Division to the 49th parallel and point of beginning.

It is only within the past few years that the New Westminster Mining Division has received a revival of attention by prospectors for metalliferous lode mines. During 1897 and 1898 there was quite a stampede into the Harrison Lake section of the Mining Division, which resulted in the location of several mineral claims on Fire mountain at the head of the lake. Since about 1900, however, there has been no activity in either prospecting or operating in the neighbourhood of Harrison lake, but some work has been done near Agassiz on the *Empress* group and on Hurling's mountain, which was described in the 1918 Report.

Some of the old locations about twenty-five miles from the head of Harrison lake in a northerly direction are still valid, notably a group owned by C. O. Wickenden, of the Terminal City Club, Vancouver. This group comprises the *Ogema*, *Staticum*, *Azimuth*, *Bear*, *Marten*, and *Port Douglas* mineral claims. The property has not yet been examined because of lack of opportunity to make the trip.

That portion of the New Westminster Mining Division which borders on the shores of Chilliwack lake, as well as the mountains bordering the International Boundary-line south of the Chilliwack river, has received some attention from prospectors resident in and near the town of Chilliwack during 1919, and late in the fall there were reports that some prospects with very promising possibilities had been discovered. This section will be examined during 1920 as the reports were received too late for examinations to be made in 1919.

The prospectors who discovered these occurrences of copper-sulphide ore were incited to select the section mentioned as attractive prospecting-ground because of the results of prospecting on the *Lucky Four* and *Merry Widow* groups of mineral claims in the Cheam range of mountains, between the Fraser and Chilliwack rivers.

Prospecting for oil has been carried on in the New Westminster Mining Division by the Boundary Bay Oil Company at Boundary bay; the Pitt Meadows Oil Company on Pitt Meadows; the Surrey Oil Company near the International Boundary, east of Semiahmoo bay; the National Oil Company near Hazelmere; the Empire Oil and Gas Company near Aldergrove; and the Spartan Oil Company near Burnaby lake; but up to the present time there has been no production of oil. The companies mentioned have all been carrying on drilling operations to a more or less extent during 1919, and in that way are giving the stockholders a run for their money.

In connection with oil, it might be noted that several oil companies have been organized in addition to those mentioned. Some of these are selling stock on the strength of having obtained leases to parcels of land in the Fraser River delta.

Cheam Range Section.

The Cheam Range section of the New Westminster Mining Division embraces the mountainous territory easterly from the town of Chilliwack to the eastern boundary of the New Westminster Mining Division. This section takes in the summit and slopes between the Fraser river to the north and Chilliwack river to the south. So far as the New Westminster Mining Division is concerned, the section did not attract much attention until 1915, when prospectors located the *Lucky Four* group of mineral claims at the head of Wahleach (Jones) creek.

Since then several other prospectors have been exploring the range of mountains, but paying most attention to the northerly slope, which is easily accessible since the Canadian National Railway has been operating trains on the south side of the Fraser river.

In the Annual Report of the Minister of Mines for 1918 the writer reported on some occurrences of molybdenite ore discovered on the northerly slope of the Cheam range, and during the past summer he was called upon to examine some mineral claims on Jones hill about fifteen miles easterly from Chilliwack, as well as the extension of the development-work on the *Lucky Four* group of mineral claims.

So far as regards other mineral claims in the section located on Ford creek and in Granite basin, on the southerly slope of the Cheam range of mountains, the examination had to be postponed until 1920 because the locations were not reported until too late in the season.

Lucky Four Group.

This group of mineral claims was very fully described in the Annual Report of the Minister of Mines for 1918, pages 284-286, and it is unnecessary to repeat the description of the conditions with regard to location, accessibility, ownership, geology, and characteristics of the ore-deposit in the present report.

Development-work.—During 1919 the development-work carried on has been driving an adit on the southerly slope of the Cheam range to determine the continuity at depth of the ore-body exposed in an open-cut sampled in 1918 and described in that report. This adit has been driven 200 feet long, and it is expected that by driving about 75 feet farther the question of maintenance of continuity of the ore at depth will be solved. There has also been a crosscut made at a point about 300 feet below the level of the adit just referred to. This crosscut is 15 feet long, with indications of ore showing in the face.

A new trail has been built a mile and a half long from the northerly summit of the range to the mine cabin on the southerly slope, about 1,200 feet lower elevation than the summit. The pack-trail from near Laidlaw Station, on the Canadian National Railway, has been repaired and reconstructed in places. The Provincial Government assisted in the trail-work to the extent of 50 per cent. of the cost.

Last Chance Group.

This group contains four mineral claims known as the *Last Chance No. 1*, *Last Chance No. 2*, *Last Chance No. 3*, and *Last Chance No. 4*, and is owned by Henry Cooper and associates, R. R. No. 2, Chilliwack. The group was examined on August 8th, 1919. It is situated on Jones hill about fifteen miles easterly from Chilliwack, and can be reached from the Canadian National Railway by wagon-road either from Popcum or Cheam View by a short trail up the mountain-side.

Geology.—The rock formation generally in the vicinity of the *Last Chance* group is granodiorite of the Coast Range batholith, but on a portion of the property there is a belt of very much altered sedimentary rocks. In these rocks are shear-zones with fissures, the walls of which are slickensided. Some of the wider fissures are filled with quartzose-talcose vein-filler. Where some work has been done the width of this vein material is fully 3 feet. The fissure has its line of strike in a N. 20° E. (mag.) direction and dip about 80 degrees to the west (mag.).

The main fissure on the group, which can be traced on the surface for a long distance, has suffered so much from erosion that on the slope of the mountain it is really a deep narrow gulch, with the bed filled with the quartzose-talcose vein material already referred to.

Characteristics of Ore-deposits.—From the appearance of the fissure filled with the quartzose-talcose vein material one would judge that there was a possibility of the vein material, which is heavily stained with iron oxides, being mineralized and possibly carrying gold and silver values. Samples were taken from the face of a short drift-adit across 18 inches wide, also from near the portal of the adit. These were assayed, but showed only traces of gold and silver.

Development-work.—The development-work on the group has been done on the *Last Chance No. 1* claim. It consists of an open-cut about 60 feet long as an approach to an adit about 15 feet long. This adit is a drift along one wall of the fissure.

Possibilities.—Although the vein material where it was sampled showed unsatisfactory assay values, it would appear from the persistency of the fissuring, the heavy iron-stain, and general character of the vein material that the group of claims merits further and more thorough prospecting than has yet been done.

VICTORIA MINING DIVISION.

The Victoria Mining Division embraces the southerly end of Vancouver island; it extends northerly to the summit of the divide between the Chemainus and Nanaimo rivers on the easterly

side of the island, and to the summit of the divide between the Nitinat river and Alberni canal on the westerly side of the island.

The history of the Division so far as metalliferous mining is concerned dates back to about 1864, when placer gold was discovered in the Sooke and Leech rivers. Since then prospectors have worked more or less continuously and have been rewarded from time to time by the discovery of deposits of ore carrying commercial values, but it was not until the discovery of the Mount Sicker deposits of copper-gold-silver ore about 1896 that mining operations were carried on to a sufficient extent to command attention from the outside world. After the *Tyee*, *Lenora*, and *Richard III.* mines on Mount Sicker were closed down about 1907 it appeared for a time as though the Victoria Mining Division would pass into history. The introduction of the oil-flotation concentration process for treating low-grade copper-bearing ore revived activity in prospecting, developing, and operating properties on which this class of ore had been discovered in various sections of the Division, until at the present time the Victoria Mining Division shows very promising possibilities and indications that it will in future take its rank with the leading metalliferous-mining divisions in the Province.

During 1919 there has been activity in metalliferous mining in the Jordan River, Cowichan Lake, Mount Sicker, and Koksilah River sections, while in the Leech River section mining talc marks the introduction of a new industry so far as the Victoria Mining Division is concerned. Another new industry, the shipment of manganese ore from the Cowichan Lake section, was established during 1919.

Jordan River Section.

Sunloch.

Full descriptions of the *Sunloch* mine were published in the Annual Reports of the Minister of Mines for 1917, pages 265-267, and for 1918, pages 300-303. In the present report the development-work carried on during 1919 only will be described. During 1919 the majority ownership of the *Sunloch* mine has been acquired by the Consolidated Mining, Smelting, and Power Company of Canada, through the purchase of the majority of the stock of the Sunloch Mines, Limited. At present W. M. Archibald, chief consulting engineer for the Consolidated Company, is general manager of the *Sunloch* mine, with John Hanna as superintendent, under whose supervision all the development-work on the mine has been carried on since it was bonded as a prospect in the spring of 1917.

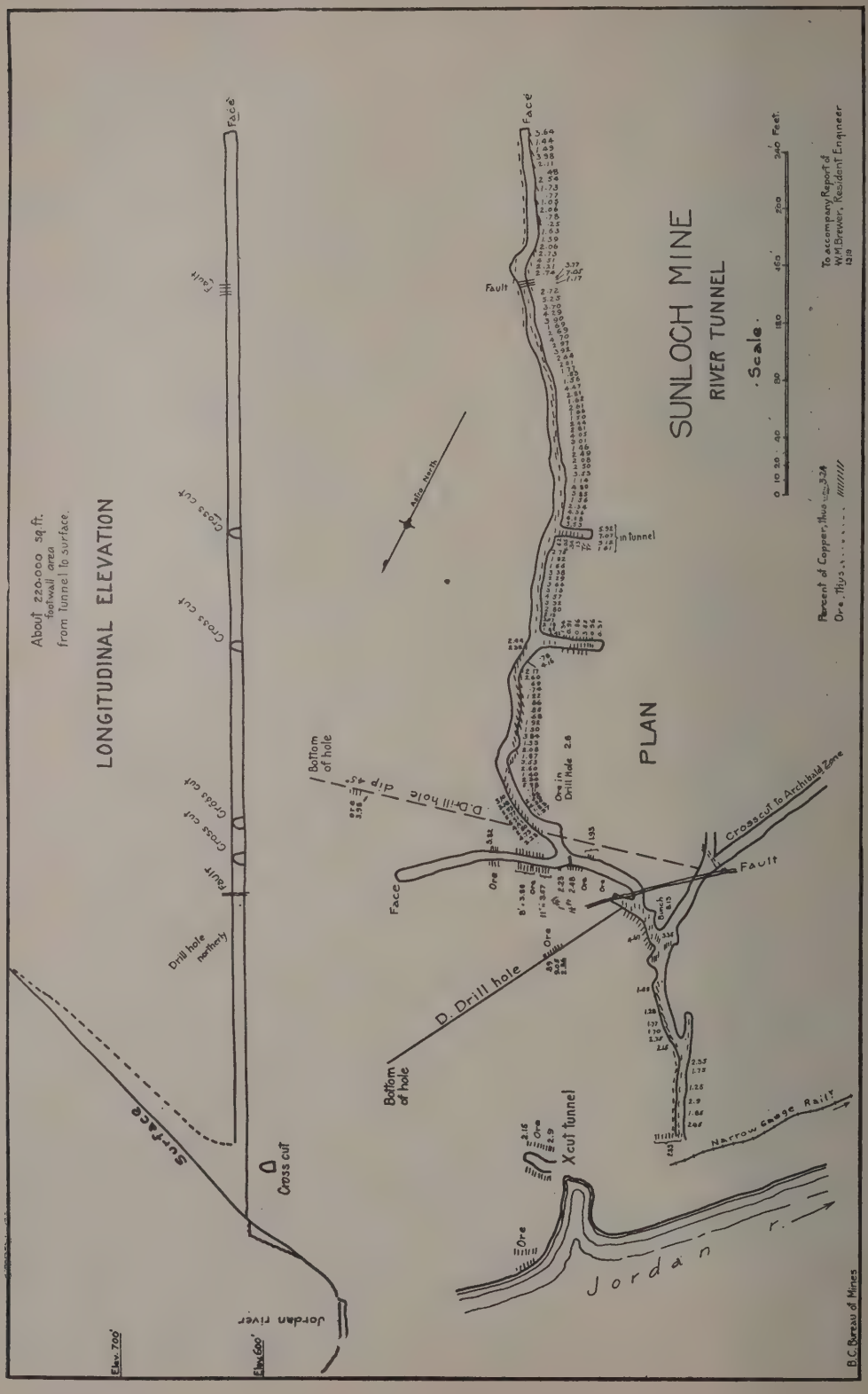
Development-work.—But little additional work was done on the Cave and Archibald zones in 1919. The River zone has, up to this writing, been developed by additional driving on the River adit on the easterly side of the Jordan river to a point where the ore-body has been proven to maintain continuity for more than 700 feet in length, as shown in the accompanying plan of that part of the mine-workings. Assays from samples taken about every 5 feet as the work progressed show that the values in copper vary from about 1 per cent. to a maximum of 7.07 per cent. The face of the River adit is about 500 feet vertically below the surface.

On the westerly side of the Jordan river, some little distance down the river from opposite to the River adit, a new adit had been driven 700 feet at the time the writer made an examination, and is to be continued to crosscut the River mineralized zone if such maintains its continuity for any appreciable distance on that side of the river. This adit started in ore at the portal; was driven through 11 feet of ore carrying about 1.5 per cent. in copper; then through country-rock for 40 feet, where a stringer of ore 18 inches wide was crosscut; then country-rock to a point about 80 feet from the portal, where a body of ore 18 feet wide was exposed. At the point where the ore last mentioned is exposed the course of the adit is changed towards the right at an angle of 45 degrees, or in the direction which would intersect the River zone, if continuous on the westerly side of the river, in about 150 feet beyond the present face of the adit.

No ore is exposed farther in the adit than the body 18 feet wide, but near the face the shearing of the country-rock, which appears to be a basalt, is very pronounced, and from the experience of the superintendent as gained from work in other parts of the mine is an indication of approaching a mineralized zone.

Gabbro Group.

Adjoining the *Sunloch* group of mineral claims is the *Gabbro* group, owned by Geo. Winkler, of Victoria, and associates. This group has not yet been examined, but the owners report that good showings of copper ore have been exposed by surface prospecting and that arrangements are completed to enable them to carry on systematic development during 1920, the results of which work will be examined and reported on.


SUNLOCH MINE
RIVER TUNNEL
Scale.
0 10 20 40 80 120 160 200 240 Feet.
To accompany Report of W.M. Brewer, Resident Engineer 1919
LONGITUDINAL ELEVATION
About 220,000 sq ft. footwall area from tunnel to surface.
Surface
Jordan river
Elev. 700'
Elev. 600'
Drill hole northerly
Fault
Cross cut
Face
Cross cut
Cross cut
Cross cut
Face
Cross cut
Fault
PLAN
Face
Fault
Bottom of hole
D. Drill hole dip 45°
Ore in Drill Hole 2.8
Ore
Ore
Ore

Cowichan Lake Section.

The Cowichan Lake section of the Victoria Mining Division has been in the limelight during 1919 by reason of the establishment of a new industry in British Columbia, that of shipping manganese ore for manufacture into ferro-manganese, and one that, judging from the high commendations expressed by the purchasers of the ore as to its quality, promises to develop into an important factor of the mineral industry of the Province.

Hill 60 Group.

This group contains *Hill 60*, *Hill 60 No. 1*, and *Hill 60 No. 2* mineral claims, which were examined on June 6th, 1919. The property was fully described in the Annual Report of the Minister of Mines for 1918, pages 296-298, but is again referred to in the present report because very important work was done during 1919 and shipments of manganese ore were made to the Bilrow Alloys Company, Tacoma, where it is manufactured into ferro-manganese, for which the demand is excellent. During 1919 the ownership of the *Hill 60* group was organized into a limited liability company registered as the British Columbia Manganese Company, Limited (Non-Personal Liability), of which C. H. Dickie is managing director and E. J. Miller is secretary, with head office at Duncan.

Development-work.—The open-cut a short distance north-westerly from the No. 1 post of the *Hill 60 No. 1* claim has been considerably enlarged, and 530 long tons (2,240 lb.) of manganese ore quarried from the cut, hauled to the Cowichan Lake extension of the Esquimalt & Nanaimo Railway, and shipped to Tacoma. This ore averaged 50 per cent. manganese and about 19 per cent. silica.

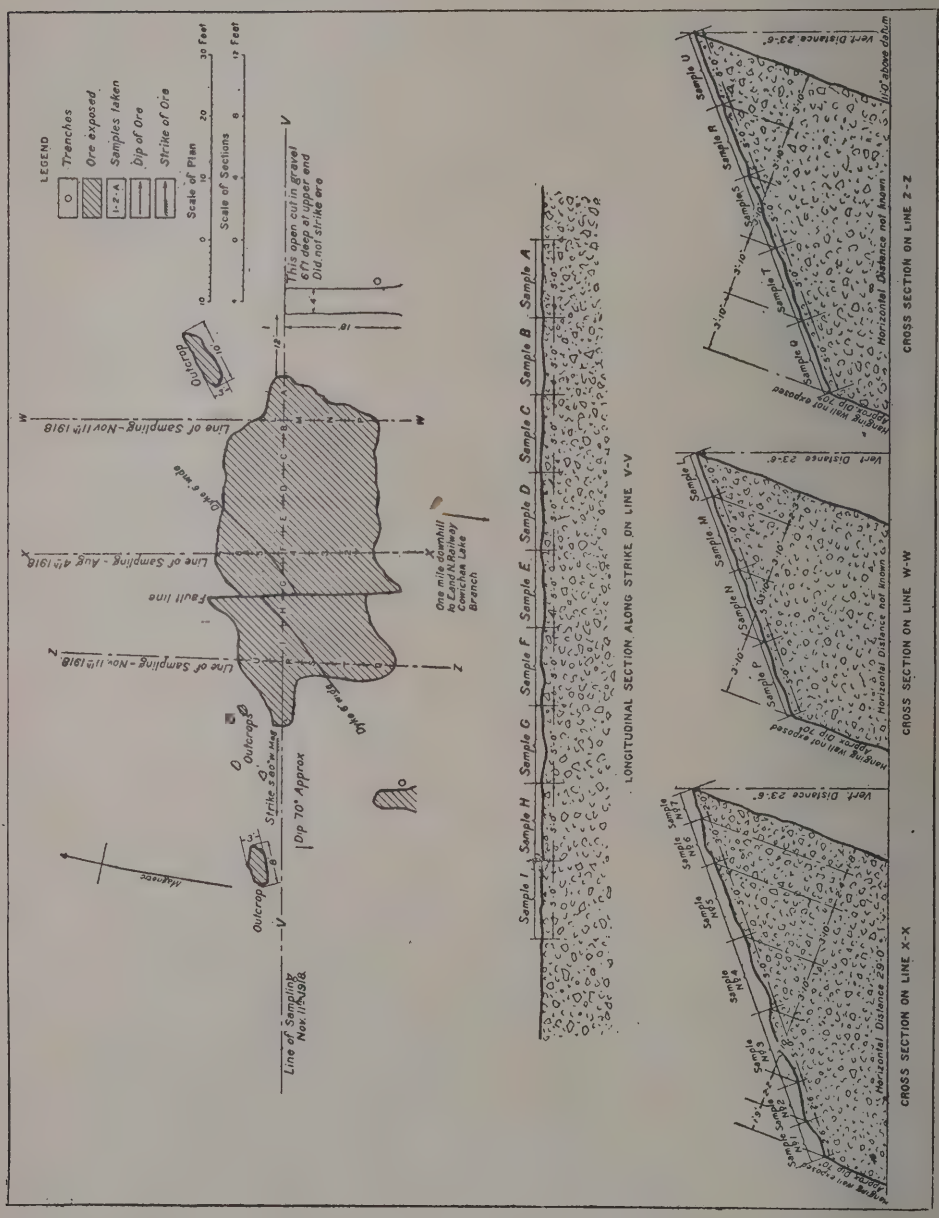
A wagon-road about four miles long was built during 1919 to connect the mine-workings with the ore-bunker on the railroad. This road was built on a fifty-fifty basis as to cost by the Government and Manganese Company. Late in the autumn it was found impracticable to continue hauling heavy loads over the road; consequently shipments were suspended and arrangements made to erect an aerial tramway which is expected will be in operation early in May, 1920, when shipments will be continued.

Note by Provincial Mineralogist.—The following plan and section of the manganese property at Cowichan lake and the table of analyses of the samplings are taken from the Final Report of the Munition Resources Commission of Canada:—

Analyses of Cowichan Manganese Ore.

(Made by Ore Dressing and Metallurgical Laboratories, Mines Branch, Department of Mines, Ottawa.)

Sample No.	Section.	Width of Samples Feet.	Metallic Manganese.		Silica.		Metallic Iron.		Phosphorus.		Sulphur.		Lime.		Alumina.	
			Per Cent.	Foot per Cent.	Per Cent.	Foot per Cent.	Per Cent.	Foot per Cent.	Per Cent.	Foot per Cent.	Per Cent.	Foot per Cent.	Per Cent.	Foot Per Cent.	Per Cent.	Foot per Cent.
1	X—X	1.75	15.88	27.79	62.84	109.97	2.82	4.93	0.048	0.084	0.073	0.127	.....	....	.....	.....
2	"	2.16	23.15	50.00	49.60	107.13	2.80	6.04	0.046	0.099	0.058	0.125	.....	.....	.....	.....
3	"	3.83	52.25	200.11	13.12	50.24	0.84	3.21	0.058	0.222	0.056	0.214	.....	.....	.....	.....
4	"	3.83	57.15	218.88	10.04	38.45	0.87	3.33	0.047	0.180	0.085	0.325	.....	.....	.....	.....
5	"	3.83	52.20	199.92	16.88	64.65	0.90	3.44	0.041	0.157	0.167	0.639	.....	.....	.....	.....
6	"	2.33	53.50	124.65	16.92	39.42	1.17	2.72	0.041	0.095	0.107	0.249	.....	.....	.....	.....
7	"	1.66	45.90	76.19	25.66	42.59	1.83	3.03	0.048	0.079	0.122	0.202	....	.....	.....	.....
A	V—V	5.00	41.64	208.20	23.32	116.60	0.99	4.95	0.080	0.400	0.080	0.400	0.05	0.25	1.10	5.50
B	"	5.00	32.90	164.50	41.60	208.00	1.50	7.50	0.077	0.385	0.110	0.550	1.20	6.00	0.58	2.90
C	"	5.00	46.12	230.60	23.05	115.25	0.89	4.45	0.051	0.255	0.074	0.370	0.05	0.25	1.02	5.10
D	"	5.00	38.55	192.75	24.18	120.90	1.01	5.05	0.059	0.295	0.103	0.515	0.08	0.40	0.67	3.35
E	"	5.00	43.18	215.90	30.19	150.95	1.50	7.50	0.073	0.365	0.095	0.475	0.98	4.90	0.58	2.90
F	"	5.00	48.59	242.95	21.60	108.00	1.24	6.20	0.053	0.265	0.090	0.450	0.80	4.00	0.50	2.50
G	"	5.00	46.79	233.95	18.20	91.00	1.68	8.40	0.081	0.408	0.070	0.350	0.70	3.50	1.08	5.40
H	"	5.00	50.32	251.60	14.56	72.80	1.52	7.60	0.057	0.287	0.085	0.425	0.23	0.15	0.96	4.80
I	"	5.00	48.20	241.00	15.50	77.50	1.38	6.90	0.060	0.300	0.100	0.500	1.60	8.00	1.80	9.00
L	W—W	2.25	48.00	108.00	21.70	48.82	2.80	6.30	0.066	0.148	0.090	0.202	0.70	1.57	0.87	1.95
M	"	3.83	43.35	166.03	24.80	94.98	1.14	4.36	0.075	0.287	0.068	0.260	Trace	.....	0.58	2.22
N	"	3.83	53.37	204.40	6.00	22.98	1.00	3.83	0.075	0.287	0.072	0.275	0.60	2.29	0.82	3.14
P	"	3.83	55.46	212.41	8.40	32 17	1.48	5.66	0.061	0.233	0.082	0.314	0.70	2.68	1.17	4.48
Q	Z—Z	3.83	21.82	83.57	53.50	204.90	2.28	8.73	0.037	0.141	0.140	0.536	0.90	3.44	2.38	9.11
R	"	3.33	46.50	178.09	18.90	72 38	2.10	8.04	0.056	0.214	0.170	0.651	1.00	3.83	0.56	2.14
S	"	3.83	51.80	198.39	10.65	40.78	1.78	6.81	0.070	0.268	0.160	0.612	1.40	5.36	0.69	2.64
T	"	3.83	25.30	96.89	29.35	112.41	3.07	11.75	0.070	0.268	0.103	0.394	2.00	7.66	2.13	8.15
U	"	3.83	34.68	132.82	32.00	122.56	2.62	10.03	0.133	0.509	0.176	0.674	1.30	4.97	1.12	4.28
Averages..	.....	3.89	.....	43.78	.....	23.28	.....	1.549	.....	0.064	.....	0.101	.....	0.77	.....	1.02


LEGEND
Trenches
Ore exposed
Samples taken
Dip of Ore
Strike of Ore
Scale of Plan
Scale of Sections
This open cut in gravel 6ft deep at upper end Did not strike ore
Outcrop
Line of Sampling - Nov. 11th 1918
Dyke & walls
Line of Sampling - Aug. 4th 1918
Fault line
Line of Sampling - Nov. 11th 1918
Dyke & walls
Outcrops
Strike 20° W mag
Dip 70° Approx
Outcrop
Line of Sampling Nov. 11th 1918
One mile downhill to Canad'n Railway Cowichan Lake Branch
Sample I
Sample H
Sample G
Sample F
Sample E
Sample D
Sample C
Sample B
Sample A
LONGITUDINAL SECTION ALONG STRIKE ON LINE V-V
Vert. Distance 23-6"
Sample U
Sample R
Sample S
Sample T
Sample Q
Horizontal Distance not known
CROSS SECTION ON LINE Z-Z
Vert. Distance 23-6"
Sample M
Sample N
Sample P
Horizontal Distance not known
CROSS SECTION ON LINE W-W
Vert. Distance 23-6"
Sample M2 6
Sample M2 5
Sample M2 4
Sample M2 3
Sample M2 2
Sample M2 1
Horizontal Distance 29-0"
CROSS SECTION ON LINE X-X

Kitchener Group.

This group contains the *Blue Grouse* and *Kitchener* mineral claims, owned by L. A. Sherk, of Oak Bay, Victoria. The group is located on the divide between the East fork of Cottonwood creek and the Chemainus river. The property was examined on June 9th, 1919. It is reached by a trail, in bad condition, from Deep bay, near the mouth of Cottonwood creek, which flows into the northerly side of Cowichan lake about twelve miles above the outlet of the lake. The distance by trail from the lake to Sherk's cabin on the *Kitchener* group is about eight miles. The cabin is on the headwaters of a fork of the Chemainus river, but the outcroppings of mineral on the claims occur near the summit of the divide, a few hundred feet higher elevation than the cabin.

Geology.—The rock formation on the *Kitchener* group is classified by C. H. Clapp in Memoir No. 13, Southern Vancouver Island, Canada Department of Mines, 1912, as belonging to the Sicker series, made up of: "Andesitic volcanic flows and tuffs with interbedded tufaceous, slaty, and quartzose sediments metamorphosed into schists and intruded by quartz-feldspar and gabbro-diorite porphyrite. Conformable with the Vancouver volcanics, and distinguished from them chiefly by their schistose character, greater mineralization, and by the presence of sedimentary members."

Characteristics of Ore-deposits.—The ore-deposits on both the *Kitchener* and *Blue Grouse* mineral claims occur on the northerly slope and near the summit of the divide overlooking the headwaters of the Chemainus river. There are several outcroppings of pyrrhotite, with some molybdenite and chalcopyrite in a gangue made up of garnet and other contact-metamorphic minerals. Some of the outcroppings are of considerable superficial extent. They occur as isolated lenses along a general line of strike towards the south-east (mag.), and where the dip can be determined it is about 40 degrees to the south-west (mag.).

Samples from two of these outcroppings, one from the *Blue Grouse* and the other from the *Kitchener*, assayed:—*Blue Grouse* sample: Gold, trace; silver, trace; copper, 1.2 per cent. *Kitchener* sample: Gold, trace; silver, trace; copper, 0.8 per cent.

Development-work.—There are several open-cuts and three adits on the *Blue Grouse* claim and some open-cuts and one adit on the *Kitchener* claim. The adits on the *Blue Grouse* claim are respectively about 20, 50, and 70 feet in length, while that on the *Kitchener* claim is about 10 feet long.

There may be more development-work on these and adjoining claims which was not examined by reason of the fact that neither Mr. Sherk nor any representative was on the ground at the time the examination was made, so that the writer had to depend on the knowledge of the guides with him, who only knew the property in a general way.

Silver Leaf Group.

This group consists of the *Mountain Ash*, *Silver Leaf*, *Arbutus*, and *Wiz Bang* mineral claims, owned by Thomas Service, of Riverside, and associates. The group is located near the head of the North-east fork of Cottonwood creek, about four miles beyond the *Kitchener* group already described. This property was not examined because of the quantity of snow that still remained covering the ground on June 8th, when an examination was attempted, and also because when, later in the season of 1919, it was proposed to make a trip to the group no guide was available who thoroughly knew the property.

From information received from G. H. Kilbourne, a consulting engineer from the Consolidated Mining, Smelting, and Power Company of Canada, who examined the *Silver Leaf* group about August, 1919, the prospects are very promising and merit thorough prospecting and development, but are handicapped at present because of lack of transportation from the group to the Canadian National Railway track on the shore of Cowichan lake, a distance by trail of about twelve miles.

Black Prince. Group.

This group contains the *Black Prince*, *Black Bess*, and *Lumber Jack* mineral claims, owned by M. Hemmingsen and C. Ryan, of Riverside, Cowichan lake. The property was examined on June 10th, 1919. The group is located on the north-easterly side of Cowichan lake, about fifteen miles up the lake from the Riverside Hotel, and at an elevation of about 400 feet above the water-level. The property is bordered by the grade of the Canadian National Railway.

Geology.—According to Clapp there is a narrow fringe of the Cowichan group of rocks skirting the north-easterly shore-line of Cowichan lake. This formation is made up of unmetamorphosed conglomerate, sandstone, and arenaceous shale. The fringe of the Cowichan group of rocks is flanked by a wide belt of Vancouver volcanics, which are the prevailing rocks on the

Black Prince group of mineral claims. The volcanics are very much sheared and in places have a schistose structure, so pronounced as to resemble the Mount Sicker schists.

Characteristics of Ore-deposits.—In the shear-zones in the country-rock there occur outcroppings of iron-stained rock, associated with which there is some pyrrhotite and iron pyrite. Samples from several outcroppings were taken and assayed, but the results showed only traces of gold, silver, and copper. The extent of the shear-zones is very considerable and the outcroppings so numerous that there is a possibility of pay-ore being found if systematic prospecting and some development-work are attempted. At the time of the examination no work had been done on the property, which had only been staked a few weeks previous.

Koksilah River Section.

The Koksilah River section of the Victoria Mining Division has been inactive since work was suspended on the *King Solomon* and *Bluebell* mineral claims about 1909, except for some work done in 1916 by Joe Gallo on the *Viva, Elsie D.*, and *Comet* claims near the *King Solomon* claim, when he shipped about 250 tons of copper ore carrying about 4 per cent. copper with low gold and silver values. This ore was hauled about four miles to Cowichan Station, on the Esquimalt & Nanaimo Railway, and the length of wagon transportation proved too costly to warrant continuing operations.

At present the Canadian National Railway has steel laid to within half a mile of some of the old properties, which will possibly revive activity in the camp, which was visited on June 24th, 1919, when the *Finlay* mineral claim was examined.

Finlay. This mineral claim is located about half a mile northerly from the Canadian National track on Land Lot No. 18, Helmcken District. The property is reached by motor or wagon from Cowichan Station until the Canadian National Railway commences operations, when it will be easy of access.

Geology.—The country-rock in the vicinity of the *Finlay* claim belongs to the Vancouver series of volcanics, in which respect this claim differs from the *King Solomon* and *Bluebell*, in both of which the ore-bodies are of the contact-metamorphic type as classified by Clapp in Memoir No. 13, Southern Vancouver Island, Canada Department of Mines, 1912.

Characteristics of Ore-deposits.—In shear-zones in the volcanic country-rock there occur outcroppings of copper and iron minerals, with iron pyrite and pyrrhotite prevailing, but with sufficient chalcopyrite associated in places with the other minerals to render some of the ore of a commercial grade, providing oil-flotation concentration is adopted for treatment process. A sample across 3 feet on the north-westerly side of a shaft about 16 feet deep assayed: Gold, trace; silver, 0.2 oz.; copper, 2 per cent.

As shafts have been sunk on three outcrops and each shaft is close-timbered and contains considerable water, no detailed examination of the workings could be made.

The location, about half a mile westerly from the Koksilah river and the same distance from the Canadian National Railway, is very favourable for the erection of a concentrating plant and for shipment of concentrates, providing further and systematized development results in determining that the body or bodies of ore are sufficiently extensive and of a grade that can be concentrated profitably.

Leech River Section.

The Leech River section of the Victoria Mining Division includes all of the area occupied by the Leech River formation, and occupying an area extending across Vancouver island from Goldstream river, in the south-eastern corner of the island, to Port Renfrew on the south-western side of the island. This formation is described by Clapp as being made up of: "Slate schist and greywackes, closely folded and possibly extensively faulted; with intrusive granite rocks and many gold-bearing quartz veins of very low-grade."

It is several years since there has been any pronounced activity in mining in the Leech River section, but during 1919 active operations were commenced by W. G. Dickenson, of Victoria, to mine talc on Wolf creek, a tributary of the Leech river. An examination was made on June 27th, 1919, and the property is described in the following report:—

Eagle. This claim is situated on Wolf creek about half a mile from Leech river and the same distance from the track of the Canadian National Railway. The mill for treating talc mined is at Sidney, Vancouver island, also on the Canadian National Railway, as well as being a deep-water harbour. Consequently the trans-

Junction of Taseko River and Iron Creek.

Iron Mountain, Taseko River.

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portation problem is easily solved, both for hauling the raw material to the mill and carrying the finished products to the markets of the world.

Geology and Mineral-deposit.—The prevailing rocks on the *Eagle* claim belong to the Leech River formation already mentioned. Wolf creek flows between steep banks, and in the westerly bank there occurs an extensive deposit of talc which contains a comparatively small quantity of impurities besides withstanding heat to a high temperature, and therefore being adapted for the manufacture of talc firebricks.

The deposit when examined in June, 1919, had been prospected only by an open-cut and short adit. The open-cut is about 12 feet wide and 30 feet long with the strike of the formation. The adit, to which the open-cut is an approach, is about 15 feet long, crosscutting the deposit of talc, but with talc still in the face, so that the full width of the deposit is undetermined, but at this particular point it is evidently more than 30 feet wide. The extent of the talc-deposit along the strike in a north-westerly direction cannot be stated accurately, because good talc is found to occur in places for a distance of about 600 feet along the creek-bank, which appears to be practically parallel with the strike of the mineral.

This discovery of a good quality of talc on Vancouver island opens up a new industry entirely, and for that reason is of considerable importance. At the present time the industry is merely in its experimental stage and on a small scale, but it has been determined that the talc is valuable and commands a market for pigment for paints, for stucco wall-board, and for firebrick.

A plant at Sidney has been equipped with machinery for treating the crude talc rock, grinding it and separating the pure talc from the grit in the rock. The process so far is not perfectly satisfactory, but Mr. Dickenson is adopting practical methods to perfect the machine to enable him to prepare a commercial product on a sufficiently large scale with regard to quantity produced to place the industry on a paying basis.

TASEKO VALLEY IRON-ORE DEPOSITS.

Report by W. M. Brewer, Resident Engineer, No. 6 District.

These deposits of iron ore occur in the Lillooet and Clinton Mining Divisions, a part of Mineral Survey District No. 3. This special report was made under the provisions of the "Iron-ore Supply Act, 1919."

Conclusions.

After a careful examination of the iron-ore deposits of the Taseko (Whitewater) River section of the Clinton Mining Division, made between August 14th and September 10th, 1919, the writer has arrived at the following conclusions:—

There are five principal factors necessary to be determined, which are at present practically unknown, in order to enable an engineer to make a report in which his conclusions as to the value of the occurrences of iron ore in the district can be classed other than rough estimates. These are: Origin of the ore; extent of the rock formations from which the ore derives its source; thickness of the beds of ore and quality to be proven either by test-pits, trenches, or drilling, and systematic sampling; feasibility and cost of constructing transportation facilities; cost of mining and transporting ore.

Origin.

In the following report theories with regard to the origin of the iron-ore deposits are suggested, but it must be remembered that the geologic conditions surrounding the deposition of the ore-beds, which are considered in the report as being chiefly composed of the limonite variety of iron rather than the bog variety, are different to those associated with the same variety of ore occurring in other parts of Canada or the United States. Consequently, so far as the writer's information extends, no conclusions can be drawn by comparisons between the geologic conditions surrounding the various occurrences until after a detailed geological examination has been made and the conditions studied and carefully worked out.

Extent of Rock Formation responsible for Origin.

The question of the extent of the rock formations responsible for the origin of the limonite-deposits is very important, and another reason why a detailed geological survey should be made. Up to date no such survey has been attempted.*

Quantity of Iron Ore.

So far as the available quantity of ore actually determined as occurring in the various deposits is concerned, it is impossible to estimate tonnage, because, except in two or three places, there are no openings made either by nature or artificially by the aid of which the cubic volume of this iron-ore deposit can be measured. The superficial area covered by the various exposed deposits examined in this section is roughly estimated at 400 acres, but there is a possibility of this extent being much larger, because in places there are indications of ore-deposits at present covered by talus, grassy hummocks, or hidden by timber.

In estimating tonnage of *actual ore*, meaning thereby such quantity as development has exposed as measurable and immediately available, the only method to adopt in the absence of development-work is to credit the various deposits with an estimated average thickness judged from experience in mining similar deposits. There is a total of approximately 400 acres covered by known exposures of merchantable iron ore in the valleys examined, and allowing 3,000 tons of iron ore in-place to the acre, providing the ore averages 1 foot in thickness. The result obtained is 400 multiplied by 3,000 equals 1,200,000 tons of ore for every foot in thickness. The only openings seen show that at those points the thickness of the ore exceeds 6 feet, which is considered a reasonable thickness to estimate. This would allow for 7,300,000 tons. However, suppose that because of the lack of actual development it is considered that it is only safe to estimate "probable" and "possible" ore, meaning thereby: *Probable ore*, meaning such ore as is only partially developed, not sufficiently so to admit of definite measurement, but of the occurrences of which the indications are sufficiently strong to warrant an assumption that such ore probably occurs; *possible ore*, meaning such ore as is undeveloped, but which may possibly be and is hoped to be found by further prospecting and development; the only indications of which are surface outcrops and which may be postulated as possible from a knowledge of the geological conditions.

With the foregoing explanations, the writer presents as an approximate estimate the following quantities:—

"Actual ore," 7,200,000 tons carrying above 40 per cent. metallic iron.

"Probable ore," 15,000,000 tons carrying above 40 per cent. metallic iron.

"Possible ore," 50,000,000 tons carrying above 40 per cent. metallic iron.

No consideration is given to samples of partly mineralized rock which assayed 20.2 and 16.4 per cent. iron.

Quality of Ore.

The assays of samples taken during the examination, and which are given in detail in the following report under the head of "Ore-deposits," show that the material classed as ore contains from 41 to 50 per cent. metallic iron; that four out of nine of these samples contained only traces of phosphorus, one sample 0.04 per cent. and the remaining four 0.23 per cent., 0.21 per cent., 0.85 per cent., and 0.52 per cent. respectively. These results place five of the samples within the Bessemer limit, with the remaining four above the Bessemer limit, but not in excess for the basic or open-hearth process of making steel. These results show that the ore can be either used in a blast-furnace as the entire charge of iron ore or will make a most desirable mixture for combination with the magnetite ore of the Province. The following paragraphs, extracted from page 252 of the book entitled "The Principles, Operation, and Products of the Blast Furnace," by J. E. Johnson, Jr., are quoted to substantiate the foregoing statement:—

"In order, therefore, to produce an iron containing a given amount of phosphorus we must provide a charge which contains just that amount. This sounds simple enough, but when the phosphorus limits desired are very low it becomes a matter of great difficulty to secure a raw material so free from that element that the iron will not contain more than the amount specified. In the case of specially low phosphorus or extra Bessemer iron described later with specification

* The Geological Survey of Canada will have, during the season of 1920, a geological party and a topographical party at work in this field.

of 0.035 per cent. and under, this difficulty becomes extreme. For instance, if 2 tons of ore, 1 ton of coke, and ½ a ton of limestone be required per ton of iron, and each of these materials contains 1.01 per cent. of phosphorus, the result in product will contain the maximum permissible amount of phosphorus, 0.035 per cent. Such raw materials are extremely rare, and in consequence iron of this kind commands a premium of several dollars per ton over iron exactly similar in other respects, but a trifle higher in phosphorus."

But later on, on page 435, in describing standard Bessemer iron, the author says with regard to phosphorus:—

"In particular material of this kind the prosphorus specifications are always low, generally around 0.04 per cent. and not to exceed 0.05 per cent. The iron for this process, therefore, must be down to about 0.03 or 0.035 per cent. in phosphorus to make the class of steel desired."

For iron for basic steel-making, on page 438, the following paragraph with regard to phosphorus is quoted:—

"The specifications with regard to phosphorus for basic open-hearth iron are very broad. Iron with Bessemer phosphorus is sometimes used, and, on the other hand, iron with phosphorus to 1.85 per cent. is successfully converted into good steel. In this country many of the irons made in the South contain from 0.85 to 1.0 per cent. These are successfully used in the basic open-hearth furnaces, but they are not regarded so favourably by steel-makers as iron containing 0.3 to 0.4 per cent. phosphorus or lower, since when the phosphorus rises above these limits the heats are apt to require longer for complete dephosphorization. This runs up the cost of conversion and so is very objectionable to the steel-maker."

For foundry iron the same author, on page 500, says with regard to phosphorus:—

"Phosphorus was formerly considered to be a detriment to foundry-casting and it was considered desirable to keep it as low as possible, or at least below 0.3 per cent., but we know now that phosphorus imparts fluidity to the metal and also increases the strength up to certain limits, so that in machinery-casting phosphorus commonly runs from 0.4 to 0.75 per cent. In some specially thin castings it runs even higher up to 1.0 per cent. in order to obtain the fluidity necessary to pour these thin shapes, while in automobile cylinders, as noted earlier, it is necessary to keep the phosphorus under 0.3 per cent. in order to prevent spongy spots in the castings."

For malleable castings, on page 502, the author says:—

"Phosphorus: The specifications for this element are much closer in the case of malleable castings than in most others. If the phosphorus be too low the metal has not sufficient fluidity, and if it be too high the metal is brittle and unreliable when annealed. The phosphorus is therefore generally kept between 0.12 and 0.25 per cent."

So far as the assays show, the sulphur contained in the ore varies from 0.44 to 2.46 per cent., which of course, is considered high, but the same author, already quoted, says, on page 19, with regard to sulphur in the ore:—

"In general, if an ore is rich and pure enough in other respects to be worth the treatment, it can be so roasted as to lower the sulphur within easily usable limits."

Cost of Mining.

All of the deposits of limonite described in this report are so located and made up of such comparatively friable material that they can be mined with steam-shovel, and the cost of mining would therefore be very low, not to exceed, at any rate, 25 cents per ton.

Transportation.

The logical location for a railroad would be up the valley of the Taseko (Whitewater) river, with which connections could be made from the various valleys in which the iron-ore deposits occur by either gravity or aerial tramways.

Of course, at the present time, there are no railway transportation facilities nearer than Mission, on the Pacific Great Eastern, at least sixty miles distant from the occurrences of iron ore described, and before any statements can be made relative to the future facilities surveys are necessary to determine the most feasible route as well as the location of the manufacturing plant where the ore would be treated. For those reasons the subject of transportation is not further discussed in the foregoing report.

INTRODUCTION.

From August 14th to September 9th, 1919, was occupied by the writer in making a trip from Vancouver to the Taseko (Whitewater) Lake and River section of the Clinton Mining Division in order to examine the occurrences of limonite or bog-iron ores reported to occur in that vicinity. The trip was made after special instructions had been received from the Hon. Wm. Sloan, Minister of Mines, and under the provisions of the "Iron-ore Supply Act, 1919," in order to ascertain the extent, quality, and accessibility of the deposits, which had never been examined for the Department of Mines.

The route followed to reach the Taseko (Whitewater) Lake section was via Pacific Great Eastern Railway from Squamish to Lillooet, where horses and supplies were secured; thence by launch via Seton lake to the foot of Mission mountain, where there is a station on the Pacific Great Eastern, from which place the main Bridge River wagon-road was followed to about five miles westerly from the crossing at Tyaughton creek, where is located the junction of the wagon-road and new trail constructed in 1919 up Gun creek. This trail was followed to its north-westerly terminus, about twenty-five miles, at the foot of Copper mountain, at the lower end of Green lake, about five miles below the head of the main fork of Gun creek. From Green lake a blazed trail was followed to the head of Gun creek; thence across the summit through Taylor's pass to the head of one of the tributaries of the Taseko (Whitewater) river. The elevation of the summit at this pass is about 7,500 feet above sea-level. The trail was blazed by E. J. Taylor, a pioneer prospector and veteran of the Canadian Overseas Forces, because it followed the only route across the summit by which crossing a glacier of any considerable size could be avoided.

From the headwaters of the Taseko (Whitewater) river the writer travelled through the adjacent country under the guidance of Indians, as there are no well-defined trails other than those used by hunters and trappers. An examination was made of the valleys tributary to the Taseko (Whitewater) river, in which occur the deposits of limonite or bog-iron ore to which the attention of the Hon. Minister of Mines had been directed, and which are located in the Clinton Mining Division of British Columbia. The distance travelled by the route described is about eighty miles from Lillooet or about 200 miles from Vancouver, but apparently the most desirable route by which to construct a railway would be via Hanceville from William lake, the proposed end of steel this fall on the Pacific Great Eastern Railway, which route would place the deposits of iron ore about 380 miles from the city of Vancouver.

GEOGRAPHY.

The Taseko (Whitewater) river has its source in glaciers on the west side of a range of mountains that reach elevations from about 6,000 to 9,000 feet above the sea-level, and which form the dividing line between the Lillooet and Clinton Mining Divisions. The same range also forms the watershed between the waters flowing into Tyaughton and Gun creeks on the easterly side of the mountains and those flowing into Taseko (Whitewater) river and Whitewater lakes, also into Big creek, on the westerly side. In a rough way a part of this range of mountains forms a portion of the easterly boundary of the Coast range and the southerly border of the Interior plateau, but the section of which the following report treats lies between the Coast range and the Interior plateau.

The area examined is roughly about five miles square and embraces a part of the valley of the Taseko (Whitewater) river, together with Schwartz, Frank Gott, and Iron Creek valleys. Schwartz valley is named after a pioneer prospector and hunter, the Frank Gott valley after an Indian guide who, although far beyond military age, succeeded in enlisting as a scout and sniper in a Canadian battalion in the recent war, and Iron creek is so named because of the discovery of deposits of limonite or bog-iron ore in that valley previous to the discoveries in other parts of the Taseko (Whitewater) section.

Schwartz, Frank Gott, and Iron Creek valleys are U-shaped and situated nearly parallel to each other, separated by high mountain ranges with glaciers covering the highest points along the summits, and the streams that flow along these valleys have cut out deep canyons as the waters approach the Taseko (Whitewater) river, to which all of the valleys are tributary from the eastern side. The valleys are consequently at a much higher elevation than that of the Taseko (Whitewater) river.

History.

It is only within comparatively quite recent years that the Taseko (Whitewater) River and Lake section of the Clinton Mining Division has attracted the attention of white men. About 1911 appears to be the earliest date, when two or three prospectors, including Henry Schwartz, from the Bridge River section made a trip across the summit by way of Warner's pass into the valley now known as Schwartz valley, previous to which time the country was known only to the Indians. In 1912 A. M. Bateman, of the Geological Survey of Canada, made an exploratory trip into the section, crossing the summit near the head of Big Creek into the headwaters of Iron creek and travelling down that creek to its junction with the Taseko (Whitewater) river, and from there, after crossing the Whitewater, travelled to Chilko lake via the Nemiah valley. A report of this exploratory trip is published in the Summary Report, Geological Survey, Department of Mines, 1912. Reference to Bateman's report shows that he only made a very superficial examination, as he mentions no occurrence of minerals other than the deposits of bog-iron in the valley of Iron creek, down which he travelled from the summit.

In 1912 a mining engineer named Crossland made a rather exhaustive examination, for private clients, of the section examined by the writer during his recent trip. After Crossland's report was made a number of mineral claims were staked by his principals, surveyed, and some surface prospecting-work done, but since then, until the present year, little attention has been paid to the section owing to the war and lack of transportation facilities.

Geology.

Bateman classifies the rocks in the section he examined—that is to say, along Iron creek and the Taseko, formerly the Whitewater river—as belonging to the volcanic series of the Tertiary age. They consist of basalts, augite andesites, andesites, rhyolites, and andesitic tuffs, breccias, and agglomerates. He states that the bog-iron ore deposits on Iron creek are of local origin and derived from disseminated pyrite contained in a bed of rhyolite which outcrops on the adjacent hillside.

The effects of glaciation are very pronounced, and some of the glaciers are still active in producing changes in the higher portions of the mountainous area, though, of course, on a much smaller scale than was the case during the glacial period.

The volcanic rocks are so heavily stained with iron oxide as to present the appearance of huge masses of limonite ore, but on a close examination it is seen that the mountains which form the walls of the valleys and reach upward several hundred feet above the floors are made up to a large extent of breccia and agglomerate, with the rock fragments cemented together with iron oxide.

Much of the oxidation appears to have taken place in the volcanic rocks while in-place, and while Bateman's theory of the origin is correct to a certain extent, yet there does not appear to be evidence of a sufficient quantity of pyrite in the country-rock to account for the very extensive beds of limonite, much of which is gravelly ore, that have accumulated on the floors of the valleys. On the other hand, the breaking-down of the steep mountain-sides and summits, made up of volcanic rocks, cemented agglomerates, and breccia, which have been for long periods in the past and are still subjected to more or less glacial action, erosion, and consequently disintegration, could be counted on to have furnished a very large percentage of the ore found in the deposits on the floors of the valleys.

One very noticeable feature of the valleys is the immense size of the beds of talus, which slope down from the surrounding mountains and often reach from near the summits 1,000 or more feet above the level of the valley-floor down to the floor itself.

The examination made by the writer convinced him that there occurs a zone of volcanic rocks on the north-easterly side of the Taseko (Whitewater) river which extend from near the head of the river and roughly parallel to the stream in a north-westerly direction. This zone appears to be bounded on the north-easterly side by a high rugged range of mountains made up for the most part of basaltic rocks having the usual columnar structure and forming a very prominent landmark, locally known as the "Battlement mountain range." The south-westerly boundary of the zone of volcanics is apparently the eastern boundary of the Coast Range granite batholith.

The occurrences of limonite ore appear to be confined to the zone of volcanic rocks, which is approximately two miles wide. The extent to the north-westerly along the strike has not been determined, but it is interesting to note that similar occurrences of deposits of limonite are reported to occur on Chilko lake, also near the headwaters of the Klinaklini river, about 100 miles distant in about a N. 60° W. direction from the deposits examined in the Taseko (Whitewater) River section.

In order to show to what extent the theory suggested by the writer as to the origin of the limonite-deposits may be convincing, grab samples of the cemented breccia and agglomerate were taken from the exposed portions of some of the mountain-sides and summits. These were assayed in the Provincial Government Laboratory, with the following results:—

Sample.	Iron.	Phosphorus.	Sulphur.	Insoluble.
	Per Cent.	Per Cent.	Per Cent.	Per Cent.
From Iron mountain	5.4	0.5	*Nil*	81.8
From mountain north-east of Iron mountain	20.2	0.06	"	62.5
From Iron ridge, Frank Gott creek	16.4	Trace	"	74.6
From bluff on Iron creek	2.5	Trace	"	94.0
From head of Iron creek	5.2	0.22	"	73 3
From head of Iron creek	4.4	0.5	"	86.5
Clay resulting from disintegration of country-rock	1.0	Trace	"	91.0
Bluff on northerly bank of Taseko (Whitewater) river near head of lake	4.2	Trace	0.65	86.1

ORE-DEPOSITS.

The limonite-deposits examined by the writer occur in the valleys formed by the Taseko (formerly called Whitewater) river, Schwartz, Frank Gott, and Iron creeks, tributaries of the Taseko river. These deposits will be described in the following report in the order in which they occur in the mineralized zone, from a south-easterly to north-westerly direction.

Tascko (Whitewater) Valley.

About three or four miles down the Taseko valley from the Taylor pass, between the head of Gun creek and the Taseko river, there occurs the first exposure of limonite ore examined. This has been exposed by a big snowslide which had swept away all timber and vegetation on the easterly side of the river for a width of about 500 feet and a distance of about half a mile from the foot of the high mountain range to the river. The main exposure of limonite ore is near the top of the course of the snowslide and measures about 500 feet from the east to west and 150 feet from north to south. In addition to this main exposure, there are also several smaller exposures only a short distance northerly from it and nearer to the foot of the same mountain, locally called "Whale mountain." The rocks in the slope and summit of this mountain are very heavily stained with iron oxides, so much so as to suggest at a casual glance the occurrence of a mountain of limonite, but the talus which covers the slope of the mountain and has resulted from the breaking-down of the rock forming the mountain contradicts any such presumption.

The exposed beds or deposits of limonite contain a large percentage of gravelly ore which covers solid ore for a thickness, in places, from 6 inches to a foot. Under the gravelly ore there occurs a bed of solid and more massive limonite of undetermined thickness, as testing in several places with a small prospecting-pick failed to bore through the ore-body.

Grab samples taken from near the foot of the mountain and near the head of the exposure, as well as near the lower end towards the river, assayed as follows:—Near the head: Iron, 41 per cent.; phosphorus, trace; sulphur, 2.24 per cent.; insoluble, 3.2 per cent. Near the lower end: Iron, 41.4 per cent.; phosphorus, trace; sulphur, 2.46 per cent.; insoluble, 2.2 per cent. From mound of ore on north side of exposure: Iron, 46.6 per cent.; phosphorus, trace; sulphur, 0.88 per cent.; insoluble, 4 per cent.

No samples were taken from the smaller near-by exposures of limonite, because the mineralization appeared to be so homogeneous that sampling was not considered necessary, especially when it is considered that the samples had to be taken to the railroad on pack-horses, the number of which was limited.

Schwartz Valley.

Schwartz valley is separated on the southerly side from Taseko (Whitewater) valley by the huge mountain locally called "Whale mountain," around the northerly slope of which the stream flows which has its source, a glacier, in Warher pass at the head of Schwartz valley, and is used as a route of travel between the head of Tyaughton creek and the Taseko valley. Schwartz valley lies at an angle from the Taseko valley, having nearly south-easterly trend, while the Taseko valley at this point is from nearly east to west, and the junction between the waters flowing through Schwartz valley and Taseko valley is near the foot of the northerly slope of Whale mountain.

The creek that flows along Schwartz valley has very little grade from the foot of the glacier for about two miles and a half, but between that point and the Taseko river the water flows through deep canyons, so that the part of Schwartz valley in which the iron-ore deposits occur lies at a considerably higher elevation than the Taseko valley. It is U-shaped, bounded on the northerly and southerly sides by high mountains, with small glaciers at and near the summits.

There are several deposits of limonite ore in the upper part of the valley. These are more or less detached, with natural exposures covering the floor of the valley for a distance of about a mile and a half.

The *McCallum* group of ten mineral claims is located on the floor of the upper part of the Schwartz valley. Exposures of limonite ore occur on each of these claims, with the utmost extensive occurring on the *McCallum Nos. 3, 4, 5,* and *6* claims, which adjoin each other and form a square block. On these claims a large proportion of the surface area, possibly about 100 acres, is covered with more or less detached exposures of limonite ore, of which gravelly ore forms a considerable percentage, but this gravel, a sample of which assayed: Iron, 44 per cent.; phosphorus, 0.23 per cent.; sulphur, 1.38 per cent.; insoluble, 7 per cent., is usually only a few inches thick and is underlaid by a bed of harder or massive ore of undetermined thickness. The hard ore is exposed by the ground-sluicing operations carried on by nature, where small streams have sluiced through the gravelly ore as the waters flow from the slopes of the surrounding mountains across the ore-deposits. A fair sample of the more solid ore picked out with a small prospecting-pick from about a foot below the surface assayed: Iron, 45 per cent.; phosphorus, trace; sulphur, 1.03 per cent.; insoluble, 8 per cent. Another sample of the hard ore assayed: Iron, 50 per cent.; phosphorus, 0.21 per cent.; sulphur, 1.06 per cent.; insoluble, 2.1 per cent.

The rocks in the mountain range on the north-easterly side of Schwartz valley, as well as the steep rocky banks of the creek flowing through the lower end of the valley north-westerly from the *McCallum* group of mineral claims, are very heavily stained with iron oxides, so much so as to give the impression of huge masses of limonite ore, but examination showed that while portions of this country-rock might be classed as ironstone and carries from 10 to 20 per cent. of metallic iron as shown by the assays of the writer's samples, yet the main bulk of the rocks are only covered with a film of oxide along the cleavage-planes, and some examples of the oxidation of pyrite in the volcanic rock were found where the gradation from unaltered pyrite to limonite was plainly seen with the naked eye.

Frank Gott Valley.

From Schwartz valley camp was moved around the north-westerly foot-hill of the range of mountains that form the north-easterly boundary of Schwartz valley into a valley lying almost parallel to the latter. This is named the Frank Gott valley after a returned Indian soldier who distinguished himself at the Front as a scout and sniper, although several years beyond military age. This valley has the same U-shaped structure generally noticeable in this part of the country. Unlike most of the other valleys, there is no pass or outlet at the upper end, which is encircled by the summit of the unbroken mountain range, with elevation reaching more than 6,000 feet above sea-level, that forms the south-easterly, southerly, and northerly boundaries of the valley, with glaciers of considerable extent on the northerly slope of the mountain range. This range averages about 1,000 feet elevation above the floor of the valley, which at the upper end is several hundred feet above the main Taseko (Whitewater) valley, and is connected with it by a creek carrying considerable volume of water which flows through a deep box canyon for about a mile from the lower end of the Frank Gott valley before it forms a junction with the Taseko (Whitewater) river. This canyon is made up of very heavily ironstained rocks.

Across the summit to the east the mountain called Iron mountain is located. The southerly slope of this mountain terminates in a creek called Hæmatite, which flows in a westerly direction towards the foot-hills of the mountain range lying between Schwartz and Frank Gott valleys.

The *Peterkin* group of mineral claims, containing nine claims, is located on the south-westerly slope of Iron mountain and in the upper part of the valley of Hermatite creek. On the *Peterkin Nos. 3, 5,* and *6* there occur exposures of limonite ore which extend from near the foot of Iron mountain across the valley of Hæmatite creek, and are crosscut by the creek between the *Peterkin Nos. 5* and *6* claims, where it flows between steep banks nearly 50 feet high. The creek crosscuts one exposed bed of limonite for a distance of about 600 feet measured by pacing up the bed of the creek. At the lower or westerly end of the deposit for about 200 feet ore occurs in the bed of the creek, but above that the bed of rock exposed in the bed of the creek is a greenish-coloured igneous rock resembling diorite, which on the southerly creek-bank is overlaid by agglomerate and breccia cemented with iron oxide that apparently forms the slope and summit of the mountain range on the southerly side of the creek, with some exposures of beds of limonite of varying extent on benches. The main exposure of limonite that is crosscut by Hæmatite creek forms the northerly bank of the creek, which rises from the water at an incline of about 30 degrees for about 100 feet. From the top of the creek-bank the limonite-deposit extends for about 300 feet, by pacing, towards the foot of Iron mountain. The width on the floor of the valley is about the same as it measures by pacing up the section crosscut by this Hermatite creek, or about 600 feet. The thickness of this deposit is undetermined, as no effort has been made to prove it by test-pits, and although the creek-banks where the deposit is crosscut are so steep as to give a vertical depth of nearly 50 feet below the surface of the outcropping and the bed of the creek, no reliable estimate of the extent of the ore can be made in the absence of crosscut trenches or drilling to prove the thickness of the deposit.

A short distance westerly from the deposit of ore there is a tributary of Hæmatite creek which flows from the north and separates the westerly foot-hill of Iron mountain from the easterly slope of Iron ridge, situated along the northerly side of Frank Gott creek. This tributary creek flows between steep banks made up principally of agglomerate and breccia cemented to a greater or lesser degree with iron oxide, a proportion of which might be classed as iron ore and mined in bulk. These creek-banks are about 15 feet high in places. The bed-rock in the creek is a granitic rock, and the extent of the cemented material is undetermined, as the tops of the creek-banks are deeply covered with talus from the mountain range to the westerly from Iron mountain, which is chiefly granitic in character.

Crossing the summit of the mountain westerly from Iron mountain, the headwaters of Frank Gott creek are reached, where the *Iron Ridge* group of ten mineral claims is located. Eight of these claims occupy both sides of the creek for a distance of 6,000 feet, as well as part of the southerly slope of a range of mountains which is practically a continuation of Iron mountain towards the west. The *Iron Ridge Nos. 1* and *2* claims are located across the summit of this mountain, with the north-westerly post of *Iron Ridge No. 2* claim situated on Iron creek near the foot of a large glacier.

On the *Iron Ridge Nos. 5, 7, 8, 9,* and *10* claims there are fairly extensive beds of limonite ore exposed in Frank Gott valley on the northerly side of the creek, while the mountain range which divides this valley from the valley of Iron creek lying north from Frank Gott are made up to a great extent of the cemented agglomerate and breccia, a grab sample of which assayed: Iron, 20.02 per cent.; phosphorus, 0.06 per cent.; sulphur, *nil;* insoluble, 62.5 per cent. This sample was taken in order to determine to what extent a proportion of the country-rock which forms so much of the mountain range had been mineralized.

Near the foot of the mountain range there occur the extensive beds of limonite, the actually exposed ore on one of which measures about 1,500 feet by nearly 200 feet. Grab samples from this deposit assayed:—Hard ore from knoll at upper end of deposit: Iron, 48 per cent.; phosphorus, 0.85 per cent.; sulphur, 0.60 per cent.; insoluble, 4.1 per cent. Gravelly ore from same deposit: Iron, 44.2 per cent.; phosphorus, 0.52 per cent.; sulphur, 1.05 per cent.; insoluble, 13.3 per cent. This exposure occurs on parts of *Iron Ridge Nos. 5, 7,* and *8* claims.

The other exposures of limonite on this group of claims occur covering parts of *Iron Ridge Nos 7, 8, 9,* and *10* claims, and although the outcroppings actually exposed appear to be detached there are indications that the beds have continuity, and if such proves correct they would cover

an area approximately 1,500 feet along the creek by a maximum length towards the foot of the mountain of nearly 1,000 feet.

Iron Creek Valley.

The valley formed by Iron creek is separated from Frank Gott valley by the range of mountains called Iron ridge, with the distance between the creeks being about a mile. The two creeks flow parallel to each other; the valley of Iron creek is U-shaped, but narrower than either Schwartz or Frank Gott valleys, with the mountains forming the northern boundary ascending more abruptly than those which form the boundaries of the other valleys referred to in the foregoing report. The range called the Battlement mountains, with the typical columnar structure peculiar to the basaltic rocks and with the strike in a north-westerly direction, forms the northern boundary of Iron Creek valley, and appears to also form the north-easterly boundary of the mineralized zone in which the limonite-deposits described occur.

The *Iron Creek* group of sixteen mineral claims is located along the floor of the valley for 12,000 feet in length by 3,000 feet in width. At the upper end of the valley near the glaciers the *No. 2* claim of the *Iron Ridge* group has its north-west corner, and above that the *Peterkin No. 10* claim is situated, with the *Black Knight Nos. 1* and *2* located east and north-east from the *Peterkin No. 10* claim.

The headwaters of Iron creek rise in a pass much used by Indians for travelling through to the headwaters of Big creek and the Chilcotin plains, and there is a dim trail up Iron creek from the Taseko (Whitewater) river.

Exposures of beds of limonite ore occur on the *Iron Creek* group, chiefly on *Iron Creek Nos. 5, 6, 7, 8, 13, 14, 15,* and *16.* The exposure on *Nos. 13, 14, 15,* and *16* is the most important, as it is actually exposed for about 750 feet by about 300 feet as a continuous bed, with indications of its extent being considerably greater, but partly covered by moss and grassy hummocks. This is the only occurrence of ore seen by the writer where there remains any evidence of prospecting-work having been done, although he was informed trenches and prospecting-pits had been made at other points, but such had all been filled by recent slides of snow and rock.

On *Iron Creek No. 16* claim there are two trenches made into the iron-ore deposit; each of these trenches is about 20 feet long by 6 feet deep. They show hard massive limonite ore throughout the work, with the same character of ore in the floors of the open-cuts, indicating a greater depth as yet undetermined. A sample of the hard ore which represented a fair average of the face of one of the cuts assayed: Iron, 47 per cent.; phosphorus, 0.04 per cent.; sulphur, 0.44 per cent.; insoluble, 4.1 per cent.

Other exposures of limonite ore occur on *Iron Creek Nos. 5, 6, 7,* and *8,* which show considerable extent, especially the occurrences on *Iron Creek Nos. 7* and *8* claims, where a goodly proportion of the surface of claim *No. 8* is covered by the exposures.

McClure's Claims.

There are some deposits of limonite on the western side of the Taseko river about six miles below the mouth of Iron creek and in a north-westerly direction from there, but no examination could be made of them because of high water, it being impossible to ford the river. However, the outcroppings could be readily seen from a bluff on the eastern side of the river nearly opposite to the locations. A trip was made from the Iron Creek camp to examine the properties, with the results mentioned. Apparently, the deposits of ore are situated in the same mineral-zone as those previously described in this report.

A group of mineral claims was staked several years since by a prospector named McClure, who is said to visit the property every year and do his assessment-work. He had already been there and left earlier than the writer's visit to this section. From the persistent manner in which he keeps up his assessment-work, it would appear that at least he considers he has a valuable property.

Mad Major Group.

The *Mad Major* group consists of twelve mineral claims, named *Mad Major* and *Mad Major Nos. 1* to *11.*

Location.—The *Mad Major* group of mineral claims is located near the head of the Taseko river, at an elevation of about 5,000 feet above sea-level and about eight miles from its confluence with Taseko lake. The claims cover the surface of the westerly slope of a high mountain locally

known as "Taylor mountain." The boundaries of the group of claims extend from the summit, down the slope across a wide basin at the foot of a glacier at an elevation of about 1,000 feet above the Taseko river; thence across the river and up the easterly slope of the range of mountains opposite to Taylor mountain.

Ownership.—The *Mad Major* group of mineral claims is owned by E. J. Taylor and associates, of Rexmount.

Accessibility.—There are several routes by which the *Mad Major* group can be reached. The shortest and most direct is from Lillooet down Seton lake to Shalalth Station, on the Pacific Great Eastern Railway; thence across Mission mountain to Bridge River wagon-road, up that to a point about six miles westerly from Tyaughton creek, where the new Gun Creek trail branches off from the Bridge River wagon-road; follow that trail to the head of Green lake at the head of Gun creek, near McKinnon's *Copper Mountain* group of mineral claims; then cross the summit through Taylor pass to the head of Taseko river and Taylor mountain.

Geology.—Taylor mountain is near the eastern border of the Coast granodiorite batholith. The prevailing country-rock on the *Mad Major* group is granodiorite. It has been very much altered, weathered, and sheared. The slopes of all of the mountains in the vicinity are covered with deep beds of talus that has been broken and ground down by glacial action in the past and which is continuing on a limited scale at the present time.

There appears to be a series of wide fissures in the shear-zones which are filled chiefly with quartz and often with brecciated country-rock.

Characteristics of Ore-deposits.—The quartz vein-filling in the fissures in the shear-zones in the granodiorite country-rock is generally mineralized with chalcopyrite and iron pyrite. In places this mineralization extends into the wall-rocks, and it is not very unusual to find specimens of the granitic rock which show very considerable mineralization in the form of impregnations of particles of chalcopyrite and iron pyrite.

Mineralization indicating low-grade ore occurrences appears to extend over quite extensive areas, but the limitations of these areas have never been determined; indeed, to thoroughly prospect the *Mad Major* group of mineral claims necessitates the expenditure of a large sum of money far beyond the ability of the present owners, who have had to content themselves with the performance of the regular annual assessment-work.

One interesting feature is the fact that so much mineralization has impregnated the granodiorite to such a noticeable extent, but whether assays of large samples will show that the values are of a commercial grade is a query that can only be solved by extensive and systematic sampling after further prospecting-work is done.

The following assay results were obtained from grab samples from places where stripping had been done:—Sample No. 1 assayed: Gold, *nil;* silver, *nil;* copper, 0.7 per cent. Sample No. 2: Gold, trace; silver, trace; copper, 1.6 per cent. Sample No. 3: Gold, trace; silver, trace; copper, 2 per cent. Sample No. 4: Gold, trace; silver, trace; copper, 0.5 per cent.

Copper King Group.

There are ten mineral claims in the *Copper King* group, known as the *Wonder, Cougar, Olive, Strand, Copper Queen No. 1, Copper Queen No. 2, Copper King No. 1, Copper King No. 2, Heather,* and *Greenwich.*

Ownership.—The *Copper King* group of mineral claims is owned by E. J. Taylor and associates, of Rexmount.

Location.—The *Copper King* group of mineral claims is located adjoining the *Mad Major No. 10* mineral claim, with the boundaries of the group extending in a north-westerly direction down the Taseko river to the canyon, a distance of about two miles below Taylor mountain.

Accessibility.—The *Copper King* group is reached by travelling over the same route as to the *Mad Major* group, just described.

Geology.—The geologic conditions on the *Copper King* group appear to be similar to those already described as occurring on the *Mad Major* group.

Characteristics of Ore-deposits.—Up to August 23rd, 1919, the time when the examination was made, there had not been as many mineralized outcroppings found containing chalcopyrite as on Taylor mountain, but the walls of the canyon on the Taseko river show stains from copper and iron oxides, indicating the occurrence of low-grade copper ore. These walls are too steep to

climb around on, and it is not possible to secure samples of the ore-outcroppings unless one is provided with ropes or finds the water very low in the river. When the writer made his examination the water was high in the river and he had no ropes.

For these reasons only one sample was taken from an outcropping near the top of the westerly wall of the canyon. This assayed: Gold, trace; silver, trace; copper, 0.2 per cent.

It would appear as though both the *Mad Major* and *Copper King* groups of mineral claims show sufficiently promising possibilities to warrant thorough prospecting. As many of the claims were only staked recently, the owners have not had an opportunity to do more than superficial work. Only a hurried examination was made owing to lack of time and importance of conserving all time possible to complete a thorough examination of the iron-ore deposits in the vicinity.

A detailed geological survey of the *Mad Major* and *Copper King* groups of mineral claims would apparently demonstrate the occurrence of similar conditions as occur on the *Copper Mountain* mineral-deposit on Copper creek, near the head of Gun creek, described by Charles Camsell in Summary Report, 1918, Part B, Canada Department of Mines Geological Survey.

Copper Mountain deposit is about eight miles in a south-easterly direction from the head of the Taseko river.

ALBERNI DISTRICT.

ALBERNI MINING DIVISION.

REPORT OF A. G. FREEZE, GOLD COMMISSIONER.

I have the honour to submit a brief annual report on mining in the Alberni Mining Division during the year ending December 31st, 1919.

Monitor Group.—No shipments have been made and no development-work has been done on this group during the year.

Big I. Group.—Other than the required annual assessment-work, little has been done on this group during the year. The Consolidated Mining and Smelting Company, Limited, of Trail, is now interested in these claims, which are situated in the Big Interior basin, ten miles from Great Central lake, and it is anticipated that development-work will be started as soon as conditions permit, the depth of snow at this time of year being a great handicap. Fourteen new claims have been staked adjoining this group.

The accompanying office statistics show that very little prospecting has been done in this district during the year, and except for the annual assessment-work there has been no actual mining development.

OFFICE STATISTICS—ALBERNI MINING DIVISION.

Mineral claims recorded	32
Certificates of work recorded	16
Free miners' certificates issued (ordinary)	19
Free miners' certificates issued (special)	3
Bills of sale, etc., recorded	3
Revenue.	
Mining receipts, general	$144 30
Free miners' certificates	133 75
Total	$278 05

CLAYOQUOT MINING DIVISION.

REPORT OF WALTER T. DAWLEY, MINING RECORDER.

I have the honour to submit the annual report on mining operations in the Clayoquot Mining Division for the year ending December 31st, 1919.

Assessment-work has been recorded as follows:—

White, Norman, Dunlop, Walton, and *Alpha* mineral claims, known as the *White* group, owned by W. N. Walton and D. McMillan, situated on the west side of Tofino creek. Making trail giving easy access to the claims, stripping earth, clearing trees and scrub, rock-work, etc.

Lucky Jim.—Situated on Elk river and owned by Wm. Spittal. Six feet of tunnel and open-cut, stripping, etc.

Dixie.—Owned by William McKay and situated on Tofino inlet. Open-cut giving entrance to a tunnel 6 feet high, 10 feet wide, and 3 feet deep; another open-cut 4 x 4 x 4 feet and other prospecting-work.

Ex, Ten, You, and *Eight.*—Situated on the Big Interior mountain, Bear river. These claims were surveyed last July (1919) by Kenneth L. Burnet, B.C.L.S., of Vancouver.

Contact.—Situated at Muchalat arm, Nootka, and owned by W. F. Poole and T. T. Gardhouse. Open-cut, with 7-foot face in rock, 25 x 7 feet.

Colorado.—Situated at Head bay, Nootka, and owned by W. F. Poole. Open-cut 10 x 6 feet, with 3-foot face, and considerable stripping and uncovering ore-body.

Northern Crown.—Situated at the mouth of Clayoquot river and owned by J. E. Martin. Some 9½ feet of 4 x 6 rock tunnelling.

Gordon, Solor No. 1, and *Great Central No. 7.*—Known as the *Laura* group, situated at the Big Interior mountain, Bear river, and owned by Wilber Johnston, of Vancouver. Considerable work in open-cuts and sinking and uncovering ore.

Empress.—Situated at Bear river and owned by John W. McIntosh, of Vancouver. Considerable stripping, uncovering ore-body, and taking out ore.

Ivanhoe and Double Standard.—Property of Wm. Wilson, of Victoria. These claims were surveyed in August, 1919, by G. A. Smith, B.C.L.S.

L. Grant and Wanderer.—Known as the *Wanderer* group, situated at the outlet of Elk river, and owned by Lachlan Grant. Tunnel 10 x 4 x 6 feet, 15 feet heavy open-cut, and 12 feet stripping.

Office Statistics—Clayoquot Mining Division.

Free miners' certificates (individual)	24
Mineral claims recorded	18
Certificates of work recorded	23
Other receipts issued	2
Transfers, etc., recorded	7

Revenue.

Free miners' certificates	$107 75
Mining receipts, general	121 95
Total	$229 70

QUATSINO MINING DIVISION.

Report by Ed. Evenson, Mining Recorder.

I have the honour to submit the annual report on the mining operations in the Quatsino Mining Division for the year ending December 31st, 1919.

Except the regular assessment, no work has been done on mineral claims in this Division.

Old Sport Group.—Development-work has been vigorously carried on by the Coast Copper Company under the supervision of William Clancy. The actual development-work has been confined to diamond-drill boring along the outcrop.

Millington Group.—Located at Spruce river, about three miles from Holberg, at the head of West arm, Quatsino. Considerable prospecting-work has been done and the showing is very promising.

Office Statistics—Quatsino Mining Division.

Mining claims recorded	102
Certificates of work recorded	158
Certificates of improvement	10
Powers of attorney, transfers, etc.	39

Revenue.

Mining receipts	$ 837 45
Free miners' certificates	314 25
Total	$1,151 70

NANAIMO DISTRICT.

NANAIMO MINING DIVISION.

REPORT OF S. McB. SMITH, GOLD COMMISSIONER.

I have the honour to submit herewith the annual report on the mining operations in the Nanaimo Mining Division for the year ending December 31st, 1919.

Conditions of the metal-mining industry in this Division have improved somewhat over the previous year, from the fact that about forty new locations have been made on Myra and Price creeks, at the head of Buttle lake, Strathcona Park.

Considerable prospecting was done on Quadra island, and some shipments of copper ore were made from the *Senator* mineral claim of the *Copper Mountain* group, near the head of Gowlland harbour, Quadra island.

Development-work on the *Marble Bay* mine on Texada island was continued to the 1,700-foot level.

The Ladysmith Smelting Corporation, Limited, has been developing the *Dawn* group of mineral claims on Thurlow island. The same corporation took a bond on the old *Blue Bells* mine, Frederick arm, on the Mainland across from Thurlow island.

A small shipment of magnetite-iron ore was made from the *Lake* mine on the west coast of Texada island for experimental treatment in the electric furnace at Vancouver.

Cornell, *Copper Queen*, and *Little Billie* mines on Texada island, the property of the Van Anda Copper Gold Company, were bonded during 1919 to the Calumet Arizona Copper Company, of Arizona. That company proposes during the coming year to extend the underground workings, also to do considerable prospecting-work by diamond-drilling.

The *Nigger Baby* group on Texada island, which has been held for several years by an old-time prospector, R. C. Miller, was acquired during 1919 by Harvey Wells and associates, of Tacoma, Wash., who have started new development-work and are thoroughly prospecting the property.

On the *Red Robin* claim, Texada island, W. S. Planta, of Vananda, has been doing some development-work.

During the year Wm. M. Brewer, Resident Engineer of the Western Mineral Survey District (No. 6), which includes the whole of the Nanaimo Mining Division, has examined a great many properties in this Mining Division. His report will contain descriptions and details of the important properties in this Mining Division, so I shall not attempt detailed descriptions.

With the exception of the above, very little has been done, other than the annual assessment-work, which has been recorded on a number of claims, as shown by the accompanying office statistics.

OFFICE STATISTICS—NANAIMO MINING DIVISION.

Mineral claims recorded	122
Certificates of work	188
Bills of sale, etc.	45
Free miners' certificates	244

Revenue.

Free miners' certificates	$1,472 25
Mining receipts	2,562 40
Total	$4,034 65

VICTORIA DISTRICT.

VICTORIA MINING DIVISION.

Report of Herbert Stanton, Gold Commissioner.

I have the honour to submit the annual report on the mining operations in the Victoria Mining Division for the year ending December 31st, 1919.

As the Resident Engineer of the District, W. M. Brewer, has fully covered the mining activities of this Division for the past year, I will not attempt to further report on these matters, and beg to submit the office statistics of this Division for the year 1919.

I am glad to be able to report that the revenue derived from mining this year shows an increase over that of preceding year of over 25 per cent.

Office Statistics—Victoria Mining Division.

Free miners' certificates issued	560
Free miners' certificates issued (special)	14
Mineral claims recorded	89
Placer claims recorded	8
Certificates of work recorded	104
Bills of sale recorded	29
Certificates of improvement issued	7
Placer-mining leases issued	1
Reverted Crown-granted claims leased	3

Revenue.

Free miners' certificates	$3,770 75
Mining receipts, general	965 25
Total	$4,736 00

VANCOUVER MINING DIVISION.

Report of A. P. Grant, Mining Recorder.

I have the honour to submit the following report of mining operations in the Vancouver Mining Division, from August 1st to December 31st, 1919:—

The following list gives the number and localities of the recorded claims in this Division:—

McNabb creek	17
Bowen island	4
Howe sound (east side)	5
Potlatch creek	6
Narrows arm	62
Howe sound (west side)	10
Indian river	8
Staamus river	13
Cypress creek	5
Queens reach	12
Lynn creek	3
Jervis inlet (head)	9
Seymour lake	14
Salmon arm	7
Skookumchuck	16

Along Pacific Great Eastern Railway	21
Egmont point	8
Bargain harbour	1
Gambier island	5
Total	226

As will be seen by the above list, the majority of the new claims are located in the Jervis Inlet district.

C. J. West, secretary of the Baramba Mining Company, whose claims are on Hotham sound, states that on their property an open-cut has been made following the vein for 100 feet in length by 6 feet in width. A tunnel 150 feet long has been driven 135 feet below the surface and open-cut, crosscutting the ore-zone, which is 23 feet in width. From this place, in addition to other values, copper assaying up to 4 per cent. has been found. Another tunnel has been commenced 50 feet above high-water level and has been driven to a depth of 90 feet.

Bowena Copper Mines, Ltd.

C. M. Oliver, secretary, states that the development-work on this property during 1919 consisted of short drifts from the bottom of the shaft and open-cuts on the different veins for the purpose of securing an average grade of ore for a milling test, the ore being trammed down to the concentrator, which was practically completed at the end of the year. In addition to building the concentrator, the lessee, C. W. Tipping, has equipped the property with water system, electric-light plant, a 10 x 10 x 14 Canadian Rand drill, steam-driven compressor, machine-drills, etc., and expects to begin steady mining and milling operations early in 1920.

Snug Cove Copper Co., Ltd.

J. E. Fitzgerald, secretary, states that on the *Snug Cove* group of claims, Bowen island, adjoining the *Bowena* mine on the north, development-work in 1919 consisted of surface cuts made in tracing the extensions of the *Bowena* veins into and through the *Snug Cove* group, and the driving of a crosscut to expose the most northerly of these veins at a depth of about 200 feet below the surface. This crosscut has been driven 135 feet, and it is estimated will have to be driven 50 or 60 feet farther to cut the vein. Several stringers have been passed through, samples from which, when assayed, show small values in gold, silver, and copper.

Britannia Mining and Smelting Co., Ltd.

E. J. Donohue, secretary-treasurer, has given me the following statement of his company's operations for the year just ended: "As all of our December production has as yet not been forwarded to the smelter, definite figures covering mineral-output are not available, but the following approximations will undoubtedly serve your requirements:—

Ore mined (actual) (tons)	642,635
Ore transported to Beach mill and stock-piles (actual) (tons)	645,910
Ore treated in Beach mill (actual) (tons)	615,300
Approximate contents of ore treated—	
Copper (lb.)	17,250,000
Gold (oz.)	4,200
Silver (oz.)	98,600

"The classification of development-work done in the mine is as follows:—

	Feet.
Drifts	4,113
Crosscuts	2,562
Raises	5,239
Chutes	850
Winzes	62
Total	12,826

"In the *Fairview* mine the operation was carried on as in former years—namely, the extension of mine drifts for stoping operations on veins previously opened.

"Mining at the upper glory-holes above the 250-foot level was not carried on as extensively as at the *Bluff* glory-hole, the latter being worked on a large scale for approximately nine months of the year, we being forced to discontinue it on account of unfavourable weather conditions.

"The 1,600-foot level was driven to connection through Britannia mountain during the year, this being the fifth tunnel to pierce the mountain, having portals on both the north and south side. On the south side, at the mouth of the 500-, 1,000-, and 1,600-foot levels, bunk-houses have been erected during previous years for the accommodation of employees working in those sections of the mine.

"The Victoria tunnel (8 x 8 feet), to the east of the *Empress* workings, at an elevation corresponding to the 1,800-foot level, advanced during the year to a total of 485 feet, from which point we are carrying on extensive diamond-drill prospecting.

"The Hillside tunnel (8 x 8 feet), to the west of the *Jane* mine on the 1,000-foot level, was advanced to a total of 480 feet.

"The raise, which is being driven on a 65-degree slope, with dimensions 7 x 12 feet, for transportation purposes between the 4,100-foot level and the 3,100-foot level tunnels, and which was commenced in the previous year, was driven for a short period only and advanced to a total of 120 feet.

"The 3,100-foot level, East drift, advanced 113 feet, work on it continuing but a short time.

"In addition to the foregoing and exclusive of the work on the 1,800-foot level, above mentioned, the diamond-drill footage for the year amounted to 3,922 feet, being distributed between the *Bluff*, *Jane*, and *Empress* sections of the mine.

"Eight hopper-bottom cars, 3-foot gauge, 20-ton capacity, and two 3-foot gauge, 20-ton, all-steel flat cars were added to our outside ore-haulage equipment for the transportation of ore between the rock-raise and the tramway and incline ore-bins.

"The welfare of the Beach community was further considered during the year by the erection of a building 64 feet long by 36 feet wide, two stories high. The ground floor is occupied by barber-shop, billiard and pool hall, and reading-room, while the upper floor is fitted up as a dance-hall, which is much in requisition during the winter months. The building is heated by steam and provided with Brasco lights throughout.

"On account of upset market conditions resulting in a very low price for copper, it was necessary to carry the operation on a reduced basis throughout practically the whole of the year, with the result that our programme in connection with transportation tunnels and raises and other construction-work was greatly curtailed."

The Lynn Creek Zinc Mines, Limited, have Crown-granted the balance of their claims in Lynn valley.

Office Statistics—Vancouver Mining Division.

Free miners' certificates issued	1,860
Free miners' certificates (special)	17
Free miners' certificates (company)	49
Claims recorded	226
Abandonments recorded	1
Certificates of work issued	487
Surveys recorded as work	90
Receipts issued for money in lieu of work	19
Grouping notices filed	49
Documents filed	10
Conveyances recorded	117
Certificates of improvements recorded	130

Revenue.

Free miners' certificates	$12,352 05
Mining receipts	4,744 35
Total	$17,096 40

NEW WESTMINSTER MINING DIVISION.

REPORT OF IRVING WINTEMUTE, MINING RECORDER.

I have the honour to submit the following report of mining operations in the New Westminster Mining Division for the year ending 1919:—

The claims recorded during the year were distributed as follows:—

Chilliwack river	8
Harrison lake	5
Jones creek	6
Pitt lake	50
Stave river	2
Jones lake	4
Total	75

The office statistics show an increase of revenue over the previous year, there being more free miner's certificates issued, although the record of mineral claims and certificates of work show a slight falling-off. There has been a great deal of prospecting at Pitt lake and vicinity, and I expect that considerable development-work will be done during the year 1920.

Annual assessment-work has been kept up on practically all the old properties, a few of the important of which are *Last Chance*, on Hurling's mountain; the *Empress* and *Contact*, situated near Agassiz; and *Cedric*, on upper Stave river.

Lucky Four Group.

The most important property on which development has been done is the *Lucky Four* at the summit of Cheam range, overlooking Jones lake. The group comprises eleven mineral claims and is owned by Sperry & White, formerly on the staff of the Pacific Great Eastern Railway. A tunnel of 150 feet was driven on the south side when operations had to be closed down on October 31st on account of heavy snow, winter quarters having not yet been established. A sample gave values of: Gold, trace; silver, 2 oz.; copper, 7.6 per cent. A trail has been constructed from the Canadian Northern Railway fifteen miles to the summit of the range. This trail will be of great assistance to the opening-up of the surrounding country for prospectors. Two cabins have also been built on the trail, which will facilitate transportation to the property in the early spring, when extensive operations are intended to be carried on.

OFFICE STATISTICS—NEW WESTMINSTER MINING DIVISION.

Free miner's certificates issued (individual)	180
Free miners' certificates issued (company)	1
Free miners' certificates issued (special)	5
Mineral claims recorded	75
Certificates of work issued	64
Conveyances, etc., recorded	15
Grouping notices filed	6
Receipts issued for money in lieu of work	5

Revenue.

Free miners' certificates	$ 918 25
Mining receipts, general	1,098 10
Total	$2,016 35

INSPECTION OF MINES.

Report of George Wilkinson, Chief Inspector.

I have the honour to submit my third annual report as Chief Inspector of Coal and Metalliferous Mines covering the year ending December 31st, 1919.

The reports of the District Inspectors relative to production of coal and coke, the number of persons employed, list of accidents and prosecutions, and brief description of the mines in the several inspectorates, and also reports of the Instructors in Mine-rescue Work and First Aid, are hereto appended.

Personnel of Staff of Inspectors and Instructors.

The personnel of the staff of Inspectors and Instructors is as follows:—

Inspectors.

George Wilkinson	Chief Inspector, Victoria.
James McGregor	Inspector, Vancouver.
Robert Strachan	Senior Inspector, Nelson (Kootenay and Boundary Districts).
H. H. Johnson	Temporary Inspector, Nelson.
William Lancaster	Inspector, Fernie.
Henry Devlin	Inspector, Nanaimo.
Thomas J. Shenton	Inspector, Prince Rupert.
Thomas R. Jackson	Inspector, Nanaimo.

Instructors, Mine-rescue Stations.

John D. Stewart	Instructor, Nanaimo.
J. T. Puckey	Instructor, Fernie.
John Thomson	nstructor, Cumberland.

Organizer and Instructor in First Aid.

Dudley Michell	Victoria (for the first nine months of the year).

By amendment to the "Coal-mines Regulation Act" during 1919 the Board of Examiners for coal-mine officials and miners was placed under the jurisdiction of the Inspection Branch. The personnel of the Board of Examiners for coal-mine officials is as follows:—

George Wilkinson,	Chairman.
James Dickson	Member of Board and Acting Inspector of Mines.
Harry E. Miard	Member of Board and Acting Inspector of Mines.

Messrs. Dickson and Miard and the District Inspector for the district in which they are holding the examination form the Board for granting Certificates of Competency to coal-miners. The Inspector of Mines is empowered to grant provisional certificates to miners for a period not exceeding sixty days between regular examinations.

Changes in the Staff during the Year.

There have been several changes in the inspection staff during the year. On February 4th, 1919, J. H. McMillan, Inspector for the Northern District, resigned, and the vacancy created was filled by the appointment of T. J. Shenton on February 27th.

On July 1st Donald McLean, a returned soldier, was appointed to fill the vacancy in the Nicola-Princeton District made by the transfer of Robert Strachan to the Crowsnest Pass District. After accepting the position, but before really taking on his duties, Mr. McLean reconsidered and decided not to join the staff. This district was therefore inspected during the whole of the year by Inspectors Strachan and Lancaster covering the coal-mines, and Inspector McGregor covering the metalliferous mines.

The Inspection Branch suffered a loss on December 8th by the death of Inspector John Newton, an efficient and faithful official. Mr. Newton had been failing in health for some time. Acting-Inspector Dickson was deputized to assist him and relieve him of the heaviest of his duties in August, and covered the district for the balance of the year.

In September Dudley Michell, Organizer and Instructor in First-aid Work, resigned, and as the most of the work was completed for the season no appointment was made for the balance of the year.

Beginning January 1st, 1920, several changes were made in the inspection districts. Inspector McGregor was moved from Nelson to Vancouver and took over all the mines in the Nicola-Princeton District, and also the *Britannia* and Texada Island mines, which was formerly covered by the Inspectors from Vancouver island. Inspector Strachan was moved from Fernie to Nelson and made Senior Inspector in charge of the Kootenay and Boundary Districts.

T. R. Jackson, formerly mine manager of No. 1 mine, operated by the Canadian Western Fuel Company at Nanaimo, was appointed to fill the vacancy created by the death of Inspector Newton.

TONNAGE OF COAL PRODUCED.

The total gross tonnage produced by the coal-mines of the Province for the year ending December 31st, 1919, was 2,408,948 long tons, a decrease of 171,848 long tons under the production of 1918.

The output would have been considerably larger had not the production been cut down by the following causes: On May 24th a strike was called at the mines of the Crow's Nest Pass Coal Company demanding recognition of the O.B.U. The strike lasted three months. The mines were opened without the demand being granted. It is estimated that some 160,000 tons was lost in production by the Vancouver Island mines through the slack time during the months of May, June, and July, caused by a falling-off in trade.

The Vancouver Island collieries had an increase in their production from 1,666,214 tons in 1918 to 1,699,348 tons in 1919, an increase of 33,134 tons.

The Crowsnest Pass collieries had a decrease in their production from 732,864 tons in 1918 to 558,806 tons in 1919, a decrease of 174,058 tons.

The Nicola-Princeton District had a decrease in its production from 179,179 tons in 1918 to 149,042 tons in 1919, a decrease of 30,137 tons.

The Telkwa mine in the Northern District increased its production from 470 tons in 1918 to 1,752 tons in 1919, an increase of 1,282 tons.

ACCIDENTS IN COAL-MINES.

The fatalities in and around the coal-mines during the year totalled twelve. There were 5,966 persons employed in and around the coal-mines.

The ratio of fatal accidents per 1,000 persons employed was 2.013, compared with 5.159 for 1918 and 8.51 for 1917. The ratio for the last ten-year period was 4.831.

The following table shows the collieries at which fatal accidents occurred during 1919, and their relation to accidents which occurred at the colliery for 1918:—

Name of Company.	Name of Colliery.	1919.	1918.
Canadian Collieries (D.), Ltd	Comox Colliery	5	2
Canadian Collieries (D.), Ltd	Extension Colliery	2	1
Canadian Western Fuel Co	Nanaimo Colliery	4	18
Pacific Coast Coal Mines, Ltd	South Wellington Colliery	..	..
British Columbia Coal Mining Co	East Wellington Colliery	..	..
Nanoose Collieries, Ltd	Nanoose Colliery	..	..
Middlesboro Collieries Co	Middlesboro Colliery	..	..
Fleming Coal Co	Coal Hill Colliery	..	2
Princeton Coal & Land Co	Princeton Colliery	..	..
Coalmont Collieries, Ltd	Coalmont Colliery	..	..
Crow's Nest Pass Coal Co	Coal Creek Colliery	1	2
Crow's Nest Pass Coal Co	Michel Colliery	..	3
Corbin Coal & Coke Co	Corbin Colliery	..	..
Telkwa Collieries, Ltd	Telkwa Colliery	..	..
Totals		12	28

The following table shows the various causes of fatal accidents and their percentage of the whole, with corresponding figures for the previous year:—

Cause.	1919.		1918.	
	No.	Per Cent.	No.	Per Cent.
Fall of rock	4	33.333	6	21.428
Fall of coal	4	33.333	1	3.572
Haulage	4	33.333	4	14.286
Explosion	..	.....	..	.....
Breaking of ropes and chains	..	.....	16	57.143
Falling timber	..	.....	1	3.571
Totals	12	100.000	28	100.000

The following table shows the number of tons of coal mined for each fatal accident in their respective classes in the years 1919 and 1918:—

Cause.	1919.		1918.	
	No. of Fatal Accidents.	No. Tons mined per Fatal Accident.	No. of Fatal Accidents.	No. Tons mined per Fatal Accident.
Fall of rock	4	602,237	6	429,687
Fall of coal	4	602,237	1	2,578,724
Haulage	4	602,237	4	644,681
Explosion	..	.....	..	.....
Breaking of ropes and chains	..	.....	16	161,170
Falling timber	..	.....	1	2,578,724

The number of tons of coal mined per fatal accident during 1919 was 200,745, compared with 92,098 tons for 1918 and an average of 87,837 tons for the past ten years.

Tonnage of Metalliferous Mines.

The output from the metalliferous mines for 1919 was 2,112,975 tons, being a decrease of 779,874 as compared with the tonnage for 1918. This tonnage was produced from 142 shipping mines, of which sixty-four shipped over 100 tons.

Accidents in Metalliferous Mines.

There were six fatal accidents in and around the metal-mines during the year, causing the death of six persons, being a decrease of six in number of accidents and a decrease of six in the number of fatalities compared with 1918.

There were 3,778 persons employed in and around the metalliferous mines, a decrease of 612 persons compared with the figures of 1918.

The ratio of fatal accidents per 1,000 persons employed was 1.588, compared with 3.66 for 1918. The ratio for the last ten-year period was 3.54.

The mines at which the fatalities occurred are:—

Mining Division.	Mine.	No. of Accidents.
Nass River	Anyox	1
Vancouver	Britannia	3
Skeena	Surf Inlet	1
Fort Steele	Sullivan	1
Total		6

The following table gives the cause and percentage to the whole of the fatal accidents with the corresponding figures for 1918:—

Cause.	1919.		1918.	
	No.	Per Cent.	No.	Per Cent.
Fall of ground	..	.....	6	50.000
By falling into chutes, raises, winzes, &c	4	66.666	4	33.334
By mine-car and haulage	..	.....	1	8.333
Material falling in shaft	..	.....	1	8.333
By cage in shaft	1	16.666	..	.....
By air-pipe breaking (surface)	1	16.666	..	.....
Total	6	100.000	12	100.000

There were no fatal accidents from falls of ground during 1919, which speaks well for the care being exercised in making the roof and sides secure. Falling down chutes, raises, etc., caused four fatalities, this being the same number as last year from this cause. One fatality was caused by a cage in shaft and one on the surface by a compressed-air pipe breaking.

There were no accidents from the use of explosives during 1919, this making two years straight free from accidents of this class. There were no fatal accidents occurring during the year in the West Kootenay and Boundary Districts, which is the first year in the history of mining in these districts that there has been no fatal accidents reported.

EXPLOSIVES.

During the year one supplementary order was issued and added to the permitted list of explosives contained in the previous explosives orders. The full list of explosives now on the permitted list are as follows:—

Monobel A1 ..... British List.
Monobel No. 1 ..... „
Dynobel No. 2 ..... „
Polar Permitite ..... „
Monobel ..... United States List.
Monobel No. 4 ..... „ „
"Giant" Coal-mine Powder No. 5 ..... „ „
"Giant" Coal-mine Powder No. 6 ..... „ „
"Giant" Coal-mine Powder No. 7 ..... „ „
"Giant" Coal-mine Powder No. 8 ..... „ „
Polar Brushite ..... „ „
Vigorite No. 1 ..... „ „
Vigorite No. 2 ..... „ „
Vigorite No. 3 ..... „ „
Vigorite No. 4 ..... „ „
Miner's Friend No. 1 ..... „ „
Miner's Friend No. 2 ..... „ „
Miner's Friend No. 3 ..... „ „
Miner's Friend No. 6 ..... „ „
Miner's Friend No. 7 ..... „ „
Viking No. 1 ..... „ „

The following table shows the quantity of explosives used in coal-mines during 1919, together with the number of shots fired, how shots were fired, tons of coal produced per pound of explosive used, and the average pounds of explosive per shot fired:—

District.	Quantity of Explosives used in Pounds.	Tonnage of District.	No. of Shots fired by Electricity.	No. of Shots fired by Fuse.	Total No. of Shots fired.	Tons of Coal per Pound of Explosive.	Average Pounds of Explosive per Shot fired.
Vancouver Island	487,332	1,699,348	585,240	350	585,590	3.5	0.83
Nicola-Similkameen	35,687	149,042	51,743	...	51,743	4.2	0.69
East Kootenay	10,250	558,806	16,504	120	16,624	54.5	0.61
Northern District	438	1,752	976	...	2,628	4.0	0.50
Totals	533,707	2,408,948	654,463	470	656,585	4.51	0.81

The production of coal per pound of explosive used is 0.31 less than that of the previous year.

The Crowsnest Pass District showed an increase of 1.23 tons per pound of explosive used, the yield being 41.6 tons, compared with 39.37 tons for 1918.

The Nicola-Princeton District showed a decrease of 0.8 tons per pound of explosive used, the yield being 4.2 tons, compared with 5 tons for 1918.

The Vancouver Island mines showed an increase of 0.14 ton per pound of explosives used, the yield being 3.5 tons, compared with 3.46 tons for 1918.

The estimated yield at Telkwa for the year is 4 tons per pound of explosive used.

Machine-mined Coal.

During the year mining-machines produced 114,910 tons of coal, or 4.75 per cent. of the whole. This is a decrease under the figures of 1918, when the percentage of machine-mined coal was 7.4 per cent.

Of the total machine-mined coal, the Canadian Western Fuel Company produced 51,895 tons, or 45.17 per cent.; the Canadian Collieries (D.), Limited, 48,115 tons, or 41.55 per cent.; the Princeton Coal and Land Company, 7,000 tons, or 6.1 per cent.; and the Crow's Nest Pass Coal Company, 7,900 tons, or 6.8 per cent.

The following table gives the district, number of machines, how driven, tons of coal produced, and type of machine used:—

District.	No. driven by		Tons of Coal produced.		Total in Tons.
	Compressed Air.	Electricity.	Electricity	Compressed Air.	
Vancouver Island	11	4	48,115	51,895	100,010
Nicola-Similkameen	4	..	.....	7,000	7,000
Crowsnest Pass	3	..	.....	7,900	7,900
Totals	18	4	48,115	66,795	114,910

Types of Machines in Use.

Type.	District.			Totals.
	Vancouver Island.	Nicola-Similkameen.	Crowsnest Pass.	
"Percussive" Post	8	4	3	15
"Bar" Longwall	3	..	..	3
"Chain" Shortwall	4	..	..	4
Totals	15	4	3	22

SAFETY-LAMPS.

There were 5,015 safety-lamps in use in the coal-mines of the Province during 1919, an increase of 651 over the previous year. Of this number, 1,422 were flame-lamps of the Wolf type and 3,593 were electric lamps, mostly Edison electric cap-lamps. There was an increase of 928 in the number of electric lamps in use during the year.

The following table shows the distribution of lamps by districts, method of locking, and the illuminant used:—

District.	Magnetic.	Screw or Automatic Clip.	Naphtha.	Electricity.
Crowsnest Pass	111	1,089	114	1,086
Nicola-Similkameen	74	188	89	173
Vancouver Island	1,193	2,360	1,219	2,334
Totals	1,378	3,637	1,422	3,593

The Edison cap safety-lamp is finding very much favour with both operators and workmen and is proving very efficient. In several instances since this type of lamp has been in use in the Crowsnest mines it is claimed it has been the means of saving life when blow-outs of gas have occurred. Over 71 per cent. of the lamps now in use in the Province are electric lamps.

MINE-AIR SAMPLING.

During the year numerous mine-air samples were taken in the coal-mines of the Province, and much valuable information has been obtained and added to that obtained in previous years relative to the flow of methane from the various coal-seams mined.

The Burrell gas-detector has been used extensively during the year for testing for smaller quantities of methane than can be detected with a safety-lamp. All the mines are now equipped with these detectors, and the Inspectors on each monthly visit test all the return air of the various splits and main return airways. The officials of the company also have them in daily use.

During the year a descriptive chart in booklet form was issued to the officials and workmen by the Hon. William Sloan, Minister of Mines. This chart shows the length of flame-cap showing by the Wolf safety-lamp for the different percentages up to 2½ per cent., which is the standard withdrawal-point set by the 1918 amendment to the "Coal-mines Regulation Act," and also gives instructions on the use of the safety-lamp for testing fire-damp. This chart was compiled from actual tests covering nearly two years. Flame-caps were measured and mine-air samples taken for analysis simultaneously. A $^{5}/_{16}$-inch flame-cap represents 2.5 per cent. in the Crowsnest Pass mines and a ½-inch flame-cap the same percentage in the Coast and Nicola mines. This chart should prove of much value to the officials and workmen.

The following table shows the tabulated data obtained from the mine-air sampling in coal-mines during 1919:—

Returns from Mine-air Samples taken in the Various Coal-mines of the Province of British Columbia during the Year 1919.

Coast District.

Sample No.	Date.	Mine.	Ventilating District.	Working or Idle.	Tonnage per Day.	Chemical Analysis.				Velocity of Air in Feet per Minute.	Quantity of Air in Feet per Minute.	Barometer.	Hygrometer.			Cubic Feet of Methane per Minute.	Cubic Feet of Methane per Day.	Lb. of Methane per Day.	Cubic Feet of Methane per Ton of Coal mined.
						CO_2.	O.	CH_4.	N.				Wet Bulb.	Dry Bulb.	Humidity.				
230	Jan. 8	Comox No. 4	Main return airway	Working	850	0.48	19.74	0.79	78.99	2,000	150,000	29.4	58	59	93	1,185	1,706,400	73,033	2,007
233	" 8	" 4	West side of No. 2 slope	"	850	0.64	18.96	2.28	78.12	365	15,330	30.6	65	68	76	348	501,120	21,447	2,505
239	" 9	" 5	Main return airway	"	900	0.11	20.60	0.21	79.08	1,870	168,300	29.2	53	54	93	353	508,320	21,756	564
243	" 15	" 7	"	"	300	0.16	20.61	0.18	79.05	1,450	145,000	29.2	47	47	100	261	375,840	16,085	772
253	Feb. 28	" 5	"	"	944	0.11	20.54	0.24	79.11	1,700	153,000	29.2	52	52	100	367	528,480	22,618	559
257	Mar. 1	" 7	"	"	300	0.15	20.57	0.24	79.04	1,640	164,000	29.2	48	48	100	393	565,920	24,221	1,886
258	" 26	" 4	"	"	950	0.44	19.84	0.87	78.85	2,200	158,400	29.5	58	58	100	1,378	1,984,320	84,928	2,088
264	May 7	" 4	"	"	900	0.52	19.48	1.19	78.81	1,930	138,960	29.5	59	59	100	1,652	2,378,880	101,816	2,643
273	" 10	" 5	"	"	944	0.11	20.47	0.21	79.21	2,170	195,300	29.4	53	54	93	410	590,400	25,269	625
274	July 23	" 4	"	"	850	0.53	19.54	1.06	78.87	2,170	156,240	29.5	60	60	100	1,655	2,383,200	102,000	2,803
175	Feb. 4	Reserve	"	"	380	0.06	20.74	0.21	78.99	730	73,000	30.6	56	57	93	153	220,320	9,429	579
15p	May 8	New No. 3	Face of slope	"	40	0.28	20.59	trace	79.13	150	2,400	27.9	42	42	100	.....	.....	.....	.....
71	Feb. 24	Princeton No. 1	Air-current from working-places	"	100	0.23	20.34	1.06	78.37	none	.....	28.4	62	68	....	.....	.....	.....	.....

Crowsnest Pass District, Corbin Colliery.

K	Jan. 6	No. 4, Corbin	Main return airway	Working	350	0.08	20.72	0.21	78.99	100	10,000	24.5	....	27	....	21	30,240	1,121	86
3c	" 15	"	Outside stoping, fire area	"	....	0.27	20.60	0.04	79.09	.....	.....	24.5	....	76	....	.....	.....	.....	.....
6c	Feb. 1	"	Main return airway	"	....	0.08	20.62	0.26	79.04	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
10c	" 25	"	"	"	300	0.10	20.68	0.21	79.01	220	26,000	24.0	45	48	100	54	77,760	2,884	259
12c	Mar. 7	"	"	"	300	0.10	20.63	0.22	79.00	150	13,500	24.0	45	45	100	29	41,760	1,549	139
14c	June 17	"	"	Idle	....	0.19	20.51	0.28	79.02	none	.....	24.2	....	....	....	.....	.....	.....	.....

RETURNS FROM MINE-AIR SAMPLES TAKEN IN COAL-MINES—*Continued.*

Crowsnest Pass District, Coal Creek.

Sample No.	Date.	Mine	Ventilating District.	Working or Idle.	Tonnage per Day.	Tonnage of Split per Day.	Chemical Analysis. CO_2.	O.	CH_4.	N.	Velocity of Air in Feet per Minute.	Quantity of Air in Feet per Minute.	Barometer.	Hygrometer. Wet Bulb.	Dry Bulb.	Humidity.	Cubic Feet of Methane per Minute.	Cubic Feet of Methane per Day.	Lb. of Methane per Day.	Cubic Feet of Methane per Ton of Coal mined.
444	Jan. 11	No. 1 South	Main return airway	Working	450		0.19	20.09	1.73	77.99	550	25,750	25.0	57	58	93	444	639,360	23,720	1,420
459	Mar. 11	"	"	"	400		0.17	20.27	1.44	78.12	600	39,000	25.0	32	32	100	561	807,840	29,970	2,019
480	June 30	"	"	Idle			3.18	9.55	4.00	83.27	stagnant									
479	" 30	"	"	"			2.06	13.71	2.26	81.97	"									
465	" 7	"	"	"			1.23	17.42	2.38	78.97										
508	Nov. 10	"	"	Working	375		0.25	20.24	1.25	78.26	600	39,000	25.2	60	61	93	487	701,280	26,017	1,870
528	Dec. 16	"	"	"	375		0.09	20.80	0.26	78.85	600	39,000	25.5	59	60	93	101	145,440	5,395	387
447	Jan. 11	No. 2	"	"	250		0.27	20.09	1.22	78.42	400	24,000	25.0	58	59	93	292	420,480	15,599	1,682
466	June 7	"	"	Idle			0.69	19.53	0.41	79.37										
478	" 20	"	Old travelling road	"			1.16	15.54	1.33	81.97										
477	" 20	"	"	"			1.38	14.58	1.51	82.43										
457	Jan. 14	No. 3	Main return airway	Working	350		0.27	20.42	1.50	77.81	800	52,000	26.0	57	59	88	780	1,123,200	41,670	3,209
490	Sept. 25	"	"	"	350		0.30	20.32	1.92	77.46	800	52,000	25.6	58	58	100	998	1,437,120	13,114	4,106
501	Oct. 30	"	"	"	375		0.23	20.45	1.25	78.07	800	52,000	26.0	59	60	93	650	936,000	34,825	2,496
505	Nov. 7	"	"	"	375		0.25	20.35	1.56	77.86	800	52,000	25.8	59	60	93	811	1,087,840	40,358	2,900
534	Dec. 18	"	"	"	200		0.19	20.46	0.78	78.57	500	35,000	26.07	54	55	93	273	393,120	14,584	1,965
493	Oct. 16	No. 1 East	South split	"	400	280	0.15	20.26	2.06	77.53	500	38,000	25.7	54	55	93	782	1,126,080	41,777	4,021
448	Jan. 11	"	Main return airway	"	380		0.13	20.43	1.11	78.33	1,500	162,000	25.5	49	51	90	1,798	2,589,120	96,058	6,815
539	Dec. 31	"	"	"	400		0.20	20.33	1.00	78.47	950	114,000	26.3	51	52	97	1,140	1,641,600	60,913	4,104
491	Oct. 16	"	"	"	400		0.23	20.26	1.27	78.24	1,400	112,000	25.7	55	56	93	1,422	2,047,680	75,968	5,179
464	May 23	"	"	"	380		0.16	20.31	1.16	78.37	1,000	108,000	25.9	48	50	86	1,252	1,802,880	66,884	4,744
511	Nov. 27	"	"	"	380		0.22	20.31	1.22	78.25	1,600	128,000	26.9	52	53	96	1,561	2,247,840	83,398	5,915
453	Jan. 14	B North	"	"	200		0.14	20.57	1.02	78.27	760	41,040	26.0	45	45	100	418	601,920	22,331	3,009
485	Sept. 18	"	"	"	150		0.16	20.58	0.91	78.35	600	33,000	25.0	50	50	100	300	432,000	16,027	9,546
503	Oct. 30	"	"	"	200		0.15	20.59	0.87	78.39	650	35,100	25.9	46	47	92	305	439,200	16,324	2,196
531	Dec. 18	"	"	"	200		0.14	20.54	1.04	78.28	650	35,100	26.0	46	47	99	365	525,600	19,599	2,628

Crowsnest Pass District, Michel Colliery.

230	Jan. 7	No. 3	Main return airway	Working	180		0.14	20.46	0.02	79.38	350	8,750	25.7	43	43	100	1	2,520	93	14
231	" 7	"	"	"	180		0.17	20.48	0.54	78.81	450	45,000	25.7	51	52	93	243	349,920	12,982	1,944
245	May 20	"	"	"	225		0.24	20.31	0.89	78.56	500	50,000	25.5	51	52	93	445	640,800	23,773	2,848
254	Sept. 19	"	"	"	200		0.42	20.18	0.87	78.53	450	45,000	25.4	48	48	100	391	563,040	15,998	2,815
266	Dec. 19	"	"	"	264		0.14	20.66	0.33	78.87	500	50,000	26.1	45	47	83	165	237,600	8,814	900
269	" 19	No. 3 East	"	"	300		0.14	20.38	1.37	78.11	1,300	81,000	26.2	48	50	90	1,109	1,596,960	27,308	5,323
264	Nov. 19	"	"	"	300						1,200	75,000	25.5	50	51	93				
261	Oct. 21	"	"	"	200		0.16	20.38	1.30	78.16	1,200	72,000	25.3	51	52	93	936	1,358,840	43,325	6,794
253	Sept. 17	"	"	"	200		0.22	20.34	1.27	78.17	1,000	63,000	25.6	53	53	100	800	1,152,000	42,739	5,760
250	May 22	"	"	"	345		0.16	20.39	1.32	78.13	1,140	71,820	25.3	48	48	93	947	1,363,680	50,592	3,952
236	Jan. 7	"	"	"	300						1,500	94,500	25.7	49	49	100				
240	" 29	No. 8	"	"	500						600	37,800	25.3							
246	May 21	"	"	"	500		0.19	20.52	0.12	79.17	700	44,100	25.7	64	64	100	52	74,880	2,778	149
256	Sept. 19	"	"	"	390		0.20	20.56	0.10	79.14	500	30,000	25.5	48	48	100	30	43,200	1,602	111

Outbursts of Gas.

Several outbursts of gas occurred in the Crowsnest Pass mines during the year, the displacement of coal varying from a few tons to as much as 260 tons of very fine dust.

The most severe outburst occurred on December 1st, 1919, and occurred in No. 6 North room, off No. 10 East slope, No. 1 East mine. Fortunately sufficient warning was manifested to allow the workmen sufficient time to escape.

Drilling to relieve the pressure has been adopted in the Crowsnest Pass mines in suspected areas and met with encouraging results. Mr. Strachan gives some interesting details on this subject in his report.

Bumps.

No severe bumps have occurred during the year, but a good many small jars have been felt without any serious results.

Mine Fires.

There have been no serious mine fires during the year, although some of the old fire areas in the mines have needed very careful watching.

Explosions.

No explosion occurred during the year 1919.

Mine-air Sampling in Metalliferous Mines.

During the year 1919 a number of mine-air samples were taken in the metalliferous mines of the Province. Much valuable information has been obtained in regard to the hydrogen, carbon-monoxide, and carbon-dioxide contents. I am much indebted to Dr. Eugene Haanel, Director of the Mines Branch at Ottawa, for co-operation in this work; the Dominion Department furnishing the sample-bottles, with franking privileges, and making all analyses without charge of any kind.

The following table shows the tabulated data obtained from mine-air sampling in the metalliferous mines:—

RETURNS FROM MINE-AIR SAMPLES TAKEN IN THE VARIOUS METALLIFEROUS MINES IN THE PROVINCE OF BRITISH COLUMBIA, 1919.

East Kootenay District.

Sample No.	Date.	Mine.	Location in Mine.	Chemical Analysis.					Hygrometer.			Remarks.
				CO_2.	O.	CO.	H.	N.	Dry Bulb.	Wet Bulb.	Humidity.	
8	June 4	Sullivan	No. 1,004 stope	0.21	20.62	.....	.....	79.17	50	49	92	
9	" 4	"	No. 1,195 stope	0.26	20.46	*	.....	79.28	50	50	100	
10		Lake Shore	No. 1,500 level	0.16	20.71	*	.....	79.13	62	56	67	
11	Nov. 19	Paradise	No. 2 tunnel	0.12	20.84	*	.....	79.04	Zero	Zero	.....	

*Negligible.

West Kootenay District.

31	Jan. 30	Hewitt	Top of stope below No. 6 tunnel	.....	.....	.....	.....	.....	.....	.....	.....	
32	" 30	Van Roi	No. 2 stope above No. 7 level, 60 feet below No. 5 level	0.05	20.76	.....	.....	79.19	.....	.....	.....	
33	Feb. 6	Slocan Star	1,001 West drift	0.17	20.65	.....	.....	79.18	.....	.....	.....	
34	" 7	Wonderful	Face of Main drift, B level	0.19	20.63	.....	.....	79.18	.....	.....	.....	
35	" 8	Ivanhoe	Face of No. 8 East drift	0.11	20 81	*	.....	79.09	.....	.....	.....	
36	" 10	Noble Five	Top of raise, 750 up from Main tunnel	0.30	20.43	*	.....	79.27	.....	.....	.....	
37	" 11	Sovereign	Stope of No. 3 raise	0.05	20.84	.....	.....	79.11	.....	.....	.....	

*Negligible.

Northern District.

1	April 25	Surf Inlet	North tunnel, No. 700	0.09	20.85	....	.....	79.06	63	61	85	
2	" 25	"	No. 6 stope, 626 level	0.20	20.50	.....	.....	79.30	63	62	93	There was a trace of inflammable gas present, but sample was too small for identification.
4	May 10	Hidden Creek	B drift, 385 level	0.05	20.88	.....	.....	79.07	59	57	88	
5	July 10	Telkwa	Face of No. 1 drift, 175 feet from surface	0.19	20.51	.....	.....	79.30	63	53	51	
6	" 14	Silver Standard	Level 253	0.20	20.65	.....	.....	79.15	61	53	59	Taken 1,000 feet from entrance of tunnel, the elevation being 2,000 feet.
6A	" 14	"	Level 254	.....	.....	.....	.....	.....	61	53	59	Taken 1,000 feet from entrance of tunnel,
7A	Sept. 19	No. 7	Face of tunnel	.....	.....	.....	.....	.....	63	61	88	Taken 1,800 feet from entrance.
8	Nov. 5	Grouse Mountain	Main tunnel at face of level, 1,500 feet	0.09	20.59	.....	.....	79.32	46	45	92	

Mine-rescue Work.

During the year the Department installed four sets of Gibbs oxygen breathing apparatus in the Nanaimo Mine-rescue Station and two sets at Merritt. Six sets of Draeger at the Nanaimo Station were remodelled into Paul breathing apparatus. Two sets of Paul breathing apparatus were installed by the Canadian Collieries, Limited.

There were forty certificates of competency in mine-rescue work issued by the Department during the year. During the year it was suggested to the management of the different collieries that all certificated officials who are medically unfit should take a course of lectures making them fit to handle the apparatus and direct operations in cases of emergency. Thirteen officials took the necessary course of lectures and were granted a special certificate covering this course.

List of Persons who have received Mine-rescue Certificates during 1919.

Date.	Name.	Where trained.	Certificate No.
March 31	Scarpino, Francis	Fernie	419
April 8	Tolley, John	"	420
" 17	Taylor, Jonathan	Cumberland	421
" 17	Mullen, Patrick	"	422
" 17	Deans, George	"	423
May 15	Green, William	Fernie	424
July 2	John, John	Nanaimo	425
" 2	Muir, Joseph E. L.	"	426
" 2	Work, William L.	"	427
" 2	Mawhinney, Arthur	"	428
" 2	Brown, James S.	"	429
" 2	Kelly, Ernest	"	430
" 2	Webster, James S.	"	431
" 2	Smith, Thomas	"	432
" 2	McCrory, Alexander	"	433
" 2	Brown, George	"	434
" 2	Montgomery, John W.	"	435
" 2	Carroll, Henry	"	436
" 2	McGregor, John C.	"	437
" 2	McIntyre, Neil	"	438
" 2	Greenwell, Archibald	"	439
" 2	Donnachie, John	"	440
" 2	Webber, Chas. Frederick	"	441
" 2	Ford, Allan	"	442
" 2	Dawson, Joseph	"	443
" 2	Carruthers, Robert S.	"	444
" 2	Wilson, Robert	"	445
" 2	Banasky, Gerald	"	446
" 2	Cheetham, Benjamin	"	447
" 2	Stafford, Matthew	"	448
" 2	McMillan, Neil	"	449
" 2	Gillam, John	"	450
" 2	Devlin, Ernest Harry	"	451
Aug. 16	Hilton, Mathias	Fernie	452
Dec. 13	Simpson, David	Middlesboro	453
" 13	Dunnigan, Richard	"	454
" 13	Neilson, Walter	"	455
" 13	Fairley, William	"	456
" 13	Holdsworth, William	"	457
" 13	Anthony, William	"	458

LIST OF PERSONS WHO HAVE RECEIVED SPECIAL CERTIFICATES FOR COURSE OF LECTURES, 1919.

Date.	Name.	Where Lectures were given.	Certificate No.
July 2	Allsopp, Henry	Nanaimo	1
" 2	Smith, Ralph	"	2
" 2	Manifold, Albert	"	3
" 2	White, John	"	4
" 2	Battey, Richard	"	5
" 2	Hill, Isaac	"	6
" 2	Gray, James	"	7
" 2	Watson, William	"	8
" 2	Handlen, James	"	9
" 2	Bryden, Alexander	"	10
" 2	Young, Alexander	"	11
" 2	Ovington, John	"	12
" 2	Devoy, William	"	13

The following table shows the number, distribution, and type of mine-rescue apparatus and oxygen resuscitating devices maintained at the coal-mines of the Province during the year 1919:—

Company.	Draeger Apparatus.		Proto or Fleuss Apparatus.		Gibbs.	Paul.	Total Apparatus.	Resuscitating Devices.			Total.
								Pulmotor.		Lungmotor.	
	2-hour.	½-hour.	2-hour.	½-hour.				Type A.	Type B.		
Canadian Western Fuel Co	4	..	4	2	6	..	16	2	..	2	4
Canadian Collieries—											
Extension	4	..	..	..	..	..	4	..	1	..	1
South Wellington	..	..	..	..	..	2	2	..	1	..	1
Comox	4	..	..	..	..	..	4	..	1	..	1
Vancouver-Nanaimo Coal Co	2	1	..	..	..	..	3	1	..	..	1
Pacific Coast Coal Mines, Ltd	2	2	..	..	2	..	6	1	..	..	1
Granby C. M. S. & P. Co	4	..	..	..	..	..	4	..	..	1	1
Middlesboro Collieries	2	1	..	..	..	..	3	1	..	..	1
Fleming Coal Co	2	2	..	..	..	..	4	1	..	..	1
Merritt Colliery	..	2	..	..	..	..	2	..	..	..	..
Princeton Colliery	1	1	..	..	..	..	2	1	..	..	1
Crow's Nest Pass Coal Co—											
Coal Creek	5	6	..	..	..	..	11	2	..	..	2
Michel	5	5	..	..	..	..	10	1	..	..	1
Corbin Coal & Coke Co	2	1	..	..	..	..	3	1	..	..	1
B.C. Government	16	10	..	..	12	6	44	4	4	..	8
Totals	53	31	4	2	20	8	118	15	7	3	25

There is one mine-rescue apparatus for every thirty-four persons working underground in coal-mines and one oxygen resuscitating device for every 166 employed underground.

The following table shows the number of mine-rescue apparatus and resuscitating devices in and around the metal-mines of the Province in 1919:—

Company.	Draeger Apparatus.			Proto or Fleuss Apparatus.	Total Apparatus.	Resuscitating Devices.			Total.
						Pulmotor.		Lung-motor.	
	2-hour.	1-hour.	½-hour.	2-hour.		Type A.	Type B.		
Consolidated Mining, Smelting & Power Co.—									
Rossland	..	..	..	4	4	2	..	2	4
Kimberley	..	..	..	2	2	1	..	..	1
Nelson	..	..	..	..	..	2	..	..	1
Ainsworth	..	..	..	2	2	1	..	..	1
Granby Consolidated Mining, Smelting & Power Co.—									
Phoenix	..	3	..	..	3	1	..	..	1
Anyox	3	..	1	..	4	2	3	..	5
Britannia Mining & Smelting Co., Britannia	4	..	..	..	4	3	..	..	3
Standard Silver Lead Mining Co., Silverton	5	..	..	..	5	1	..	..	1
Montana Continental Development Co., Tramville	..	..	..	..	..	1	..	..	1
B.C. Copper Co.—									
Mother Lode	..	..	..	..	..	..	..	1	1
Copper Mountain	..	..	..	..	..	..	..	1	1
Totals	12	3	1	8	24	12	4	4	20

The number of persons employed in and about the coal and metalliferous mines was 9,744, giving one mine-rescue apparatus for every sixty-nine persons employed and one oxygen resuscitating device for every 216 persons employed.

Technical Classes on Mining.

Considerable interest has been maintained in this work around the coal-mining centres. The correspondence course issued by the Education Department for firebosses and shotlighters, overmen and managers, and also mine surveyors, has found much favour.

Supervision of Coal-mines.

During the year fourteen coal companies operated sixteen collieries, with thirty-six mines, employing 4,146 men underground. In the supervision of these underground employees there were twenty-one managers, thirty-three overmen, and 176 firebosses and shotlighters, a total of 230 officials, or one official for every eighteen persons employed underground. I desire to express my appreciation of the faithful co-operation and assistance afforded me throughout the year by the District Inspectors and Instructors in mine-rescue and first-aid work.

Suggestions regarding Legislation.

Legislation was enacted during the year setting a standard withdrawal-point as suggested in last year's report, but the writer is still of the opinion that the other matters suggested should have attention— namely, that some limit should be set for the permissive percentage of gas in the air in which to allow blasting operations.

At present the requirements of the various Acts in different countries are very vague on this point, dealing more with permissive explosives than with percentages of gas; but the writer is of the opinion that even with the use of permissive explosives there ought to be a limit set for percentages of gas in the air when blasting is allowed.

The writer is also of the opinion that legislation should be enacted compelling certain lines of treatment of coal-dust in the mines. It has now been proved beyond doubt that coal-dust is the greatest menace in the mines for propagating an explosion. The modern ventilating equipment of the mines does not allow any large accumulations of gas, providing the conducting of the current is done in the proper manner, and it would be hard to find a case in the present day where there would be sufficient gas to propagate an explosion throughout the mine. But with a very small quantity of coal-dust added this becomes possible in the event of any primary explosion of gas; hence the need of laws compelling the removal and treatment of coal-dust.

The writer would also suggest that changes be made in the Act regarding the standardization of the ventilation in mines, as to what "an adequate amount of ventilation" means as stated, that the workings of the mine shall be in a fit state for working and passing therein. The British Columbia "Coal-mines Regulation Act" reads as follows: "An adequate amount of ventilation shall mean not less than one hundred cubic feet per minute for each man or boy and not less than three hundred cubic feet of pure air per minute for each horse or mule employed in the mine, and as much more as the Inspector of Mines may direct shall sweep the face of each working-place." This standard cannot be adopted generally, as there is such a variation of conditions in the various mines.

The British Act reads as follows: "A place shall not be deemed to be in a fit state for working or passing therein if the air contains either less than nineteen per cent. of oxygen or more than one and one-quarter per cent. of carbon dioxide, and an intake airway shall not be deemed to be normally kept free from gas, inflammable gas, if the average percentage of inflammable gas found in six samples of air taken by an Inspector in the air-current in that airway at intervals of not less than a fortnight exceeds one-quarter." The writer would suggest that a similar clause to the above should be adopted by British Columbia in the "Coal-mines Regulation Act."

A standard of the conditions allowed being set, then every mine would have to standardize to these conditions; whereas now in the existing clause the amount of ventilating is set in cubic feet per man, boy, and mule. This amount may be all right in non-gaseous mines and yet totally inadequate in gaseous mines.

In concluding this report, I beg to draw your attention to the system of inspection in British Columbia—namely, that an inspection must be made every month—which means that the inspections come at regular intervals, and becomes practically a formal inspection and can be prepared for by the mine officials. An Inspector starting off on his monthly inspection, having a fairly large district, cannot deviate much from a regular round if he has to visit each mine monthly, so that it can be told to a few days when he will be at a certain mine, and conditions are naturally made as good as possible for his visit. The result is easily seen; he makes an inspection under favourable conditions and posts his report, and the under-officials take refuge behind his report as being the standard for the month. The situation then develops almost making the Inspector manager of the mine, and thereby relieving the officials in this respect. In the writer's opinion the visit should be more of a surprise visit, even though he should only inspect a portion of the mine, and when negligence is in evidence stringent measures should be adopted.

Neither in Great Britain, France, Belgium, nor even in the neighbouring Provinces is the Inspector compelled to visit each mine and every part thereof monthly, but can make them oftener when necessary, or less when not necessary.

Frequent inspections in some cases may be very good, but in some cases too frequent inspection may be more harmful than otherwise, as it tends to encourage the officials to rely on the Inspector for seeing the requirements of the Act carried out, and thereby neglecting their own duties in that respect.

EXAMINATIONS FOR COAL-MINE OFFICIALS.

The "Coal-mines Regulation Act," as now consolidated and amended, provides that all officers of a coal-mining company having any direct charge of work underground shall hold Government Certificates of Competency, which are to be obtained only after passing an examination before a duly qualified Board, appointed for the purpose of holding such examinations, and known as the Board of Examiners.

The certificates granted on the recommendation of such Board and the requirements shall be as follows:—

"(*a.*) If a candidate for a manager, that he is a British subject and has had at least five years' experience in and about the practical working of a coal-mine, and is at least twenty-five years of age; or, if he has taken a degree in scientific and

mining training, including a course in coal-mining at a university or mining school approved by the Minister of Mines, that he has had at least four years' experience in and about the practical working of a coal-mine:

"(*b.*) If a candidate for overman, that he has had at least five years' experience in and about the practical working of a coal-mine, and is at least twenty-three years of age:

"(*c.*) If a candidate for shiftboss, fireboss, or shotlighter, that he has had at least three years' experience in and about the practical working of a coal-mine, is the holder of a certificate of competency as a coal-miner, and is at least twenty years of age:

"(*d.*) A candidate for a certificate of competency as manager, overman, shiftboss, fireboss, or shotlighter shall produce a certificate from a duly qualified medical practitioner or St. John or other recognized ambulance society, showing that he has taken a course in ambulance-work fitting him, the said candidate, to give first aid to men injured in coal-mining operations.

"For the purposes of this section the experience demanded by such section shall be of such character as the Board shall consider of practical value in qualifying the candidate for the position to which such class of certificate applies.

"Experience had in a mine outside of the Province may be accepted should the Board consider such of equal value."

Any certificate is considered as including that of any lower class.

EXAMINATION FOR MINERS.

In addition to the examinations and certificates already specified as coming under the Board of Examiners, the Act further provides that every coal-miner shall be the holder of a certificate of competency as such. By "miner" is meant "a person employed underground in any coal-mine to cut, shear, break, or loosen coal from the solid, whether by hand or machinery."

Examinations of applicants for certificates of competency as coal-miners shall be conducted and certificates of competency granted by a Board of Examiners, which shall consist of the Inspector of Mines for the district in which the examination is held, and two other members to be appointed by the Minister, one of whom shall be appointed to represent the mine-owners and one to represent the coal-miners. The two appointed members of the Board shall have jurisdiction in all districts throughout the Province. The Minister shall appoint one of the appointed members to be Chairman and the other to be Secretary of the Board, and they shall hold office during the pleasure of the Minister.

Where any member of the Board of Examiners is unable to act at any examination by reason of illness, absence, or other cause, the Minister may appoint a person to act in the stead of that member for that occasion, or until the termination of the disability, and any person so appointed may complete any unfinished business of the Board in which he has taken part, even if the member in whose stead he has acted has become able to act.

The proceedings of the Board of Examiners shall be in accordance with the rules in the Third Schedule to the Act.

Examinations of applicants for certificates of competency as coal-miners shall be held on at least one day in every period of sixty days at each colliery designated by the Minister as a place for the holding of examinations under this section.

The work of the Board of Examiners in examining candidates for coal-miners' certificates has been carried on in all mining districts at intervals of less than sixty days, as required by the amendment of the Act.

No certificates have been granted in any case where the candidate failed to satisfy the Board as to his general fitness, experience in a coal-mine, and a working knowledge of the English language.

BOARD OF EXAMINERS FOR COAL-MINE OFFICIALS.

FIRST-, SECOND-, AND THIRD-CLASS CERTIFICATES.

Report of James Dickson, Secretary of Board.

I have the honour to submit herewith the annual report of the transactions of the above Board for the year ending December 31st, 1919.

The Board of Examiners, which was formed on July 1st, 1919, consists of George Wilkinson, Chief Inspector of Mines, as Chairman; Harry Ernest Miard, member; and James Dickson, member and Secretary of the Board.

The meetings of the Board are held in the office of the Board, Mines Department, Victoria. The first work was the drafting of the following rules for the conduct of examinations for certificates of competency as mine officials:—

RULES MADE BY THE PROVINCIAL BOARD OF EXAMINERS, JULY 16TH, 1919, AND APPROVED BY THE MINISTER OF MINES, JULY 16TH, 1919, UNDER SECTION 38 OF THE "COAL-MINES REGULATION ACT, 1911," AND AMENDMENT ACT, 1919, FOR THE CONDUCT OF EXAMINATIONS.

1. No application for examination will be considered from any candidate unless it is received by the Department of Mines at least fifteen days previous to the date on which the examination is to be held.

2. The examination sittings shall begin at 9 a.m. and continue until 12.30 p.m.; they shall resume at 2 p.m., and continue until 5.30 each day until the conclusion of the examination.

3. The examinations shall be conducted by the Presiding Examiners appointed by the Board.

4. The Presiding Examiners shall be present in the examination-room at least fifteen minutes prior to the time at which the examination commences.

5. Before each examination the question papers shall be prepared by the Examiners appointed by the Minister, and the necessary copies forwarded to the Presiding Examiners, each set of papers being in a separate sealed package.

6. At the time of the commencement of each session of the examination, when the candidates are in their respective places, the seal of the package shall be broken in the examination-room in the presence of the candidates and the papers distributed punctually in accordance with the time-table on the package.

7. Candidates must present themselves punctually at the hours appointed for the commencement of the examination, and no candidate will be allowed to enter the examination-room later than forty-five minutes after the time set for the commencement of the examination, nor will any candidate be allowed to leave the room during a sitting unless in case of extreme necessity.

8. When the time allotted to each paper has expired, the papers shall be collected by the Presiding Examiners and immediately placed in a package and sealed. At the completion of the examination these papers shall be forwarded to the office of the Board of Examiners for Coal-mine Officials, Victoria, B.C.

9. The examination shall be conducted strictly in accordance with these rules, and the papers of any candidate who does not comply with these rules may be cancelled at the discretion of the Board.

10. The Presiding Examiners shall see that the room is clear of all possible aid to the candidates, and that no persons other than the Honourable the Minister of Mines, the Deputy Minister of Mines, the Provincial Mineralogist, members of the Board, Inspectors of Mines, and Examiners be allowed in the examination-room during sessions.

11. All stationery required for the purpose of the examination shall be supplied by the Board. All surplus stationery shall be collected by the Presiding Examiners at the completion of the examination. Each candidate shall be supplied with pens, ink, pencils, and blotting-paper.

12. The papers shall be collected at the times indicated by the time-table. If from any cause a paper is not given out precisely at schedule time, the candidates must be informed of the fact and the exact time at which their work will be collected, and care must be taken that the exact time is allowed from the moment from which the paper was given out. The time consumed in collecting and giving out papers must not be included in the "full time" allowed for any paper. A candidate who attends late shall not be allowed any extension of time on that account.

13. Before proceeding to his seat in the examination-room a candidate shall lay aside his hat and overcoat, and any book, papers, or appliances the use of which is not expressly allowed to him. The candidate shall be allowed to bring with him a drawing-scale, slide-rule, protractor, a pair of compasses, and logarithmic and trigonometrical tables. Apart from such special articles, a candidate shall be at liberty to take to his place in the examination-room such ordinary appliances as pens, ink, penknife, chalks, and india-rubber; but the Presiding Examiners may, at their discretion, prohibit the use of any such articles.

14. If a candidate arrives late a note of the circumstances shall be made, and it shall always be stated whether any other candidate has already left the room.

15. The Presiding Examiners shall collect at the commencement of the examination the authorization obtained from the Department of Mines for appearing at the examination-room, and no candidate shall be allowed to enter the examination-room unless he presents such authorization.

16. Silence shall be observed in the examination-room while the examination is in progress.

17. The Presiding Examiners shall take every precaution to see that no candidate receives any improper assistance, either from books or papers or from any person. They shall check all disorderly or improper conduct in or about the room, enforce all rules for the conduct of the examination, and report to the Board any irregularity which may occur or any shortcoming in the arrangements for the examination.

18. Should it appear to the Presiding Examiners that a candidate has obtained improper assistance the papers of such candidate shall be cancelled. Any candidate giving assistance to another candidate shall be held to be equally guilty and shall be dealt with accordingly.

19. No candidate shall be allowed to leave the examination-room until the expiration of one hour after the time fixed for the commencement of the paper on which he is engaged.

A candidate obliged to leave the room through illness or other sufficient cause, and who wishes to return and continue work on the paper then in progress, shall leave the room in charge of a Presiding Examiner; a note as to the circumstances shall be made and the part of the paper at which the candidate was at work shall be endorsed by the Presiding Examiner, "The candidate left at this point."

Candidates shall not, without the express permission of the Presiding Examiners, remove from the examination-room any paper or other material supplied to them.

20. A candidate who asks a question as to any ambiguity in the papers shall be told to enter on his work any representation he may wish to make, but no further answer shall be given. The Presiding Examiners shall, themselves, forward a report to the Board stating the candidate's name and the general nature of the question.

A candidate making a complaint of any other nature shall be directed to make his statement in writing, which shall be sent to the Board.

21. Candidates shall be allowed, unless there is any special directions to the contrary, to keep their work in any subject until the expiration of the time allotted to that subject.

Every book, plan, form, or separate sheet of paper used by the candidate shall have inserted on it the name of the subject. The number of each question shall be inserted in the margin which shall be left along the left side of each sheet. In no case shall the name of the candidate be placed on any book, plan, form, or separate sheet of paper upon which the candidate has written or worked the answer to any question; but for the purpose of identification of papers the following system shall be used: At the commencement of the examination each candidate shall choose a number; he shall place this number on a slip furnished for this purpose, together with his name, and place the same in an envelope supplied for the purpose. These envelopes shall remain sealed until the paper has been examined. The candidate shall number all his examination papers with the number he has chosen and placed on the slip with his name.

22. Not more than one answer shall be written on the same sheet of paper. All answers shall be written in ink (except necessary diagrams, which may be in pencil) and on one side only of the paper, and each candidate shall enclose his question paper with his answers in the envelope supplied for the purpose.

23. After the Examiners have received the papers they will correct them and mark on them the marks obtained by each candidate for each paper.

24. After the examination the candidate will be furnished with a list of the marks obtained by him in the different subjects, but not the marks for the individual questions.

25. The apparent or presumed results of the examination shall not be communicated to any person until the same have been officially announced.

26. All correspondence intended for the Board must be addressed to the "Office of the Board of Examiners for Coal-mine Officials, Victoria, B.C."

27. The Presiding Examiners must see that the candidate obtains the right paper of questions.

28. All the work by which the results are obtained shall be clearly shown in immediate connection with the answer, so as to enable the Examiners to satisfy themselves that the candidate has understood the question and to see by what process the results were obtained. Anything which the candidate does not wish the Examiners to notice should be crossed out with pen or pencil, but not erased.

29. In the case of any applicant producing a certificate from a medical practitioner instead of from a recognized ambulance society, as provided for in section 41, subsection (*c*), such certificate shall be in the following form:—

"I hereby certify that I have examined , of , in ambulance-work, and find him qualified to render first aid to persons injured in or about a mine.

"(Signed.).....

Medical Practitioner."

30. The nature of the practical experience shall be experience gained in one or other of the following capacities in a coal-mine, or in a capacity which may be considered by the Board to be equivalent to:—

(*a*.) An underground official of a coal-mine—

(1.) In actual practical work at the working-face and other parts of the underground workings of a coal-mine;

(2.) In direct supervision of such work; or
(3.) In both (1) and (2); or

(*b.*) As an underground workman of a coal-mine who has had direct practical experience in the work of getting minerals, and of stonework, timbering, and repairing:

(*c.*) As mine surveyor. In the case of a person employed as mine surveyor, the practical experience will be considered to be the time the applicant has been employed underground in a coal-mine.

31. Candidates for certificates must possess such knowledge as will enable them to answer promptly questions on the following subjects:—

For First-class Certificates—
(1.) Mining Act and Rules:
(2.) Mine Gases:
(3.) Ventilation:
(4.) General Work:
(5.) Mining Machinery:
(6.) Surveying and Levelling.

For Second-class Certificates—
(1.) Mining Act and Rules:
(2.) Mine Gases:
(3.) Mine Ventilation:
(4.) General Work, including questions on underground machinery and surveying.

For Third-class Certificates—
(1.) Mining Act and Rules and Mine Gases:
(2.) Mine Ventilation and General Work.

For Mine Surveyors' Certificates—
Surveying, levelling, and drawing; determination of magnetic declination; loose and fast needle surveying underground and on the surface; calculation of areas and volume; contour lines and levelling; connecting of surface and underground surveys; triangulation; plotting by protractor and latitudes and departures; mine plans and sections; the use, care, and testing of the instruments.

32. A candidate for First-class Certificate of Competency must obtain 70 per cent. of the maximum marks obtainable for the first three subjects, Mining Act and Rules, Mine Gases, and Ventilation; and 60 per cent. of the marks obtainable on the fourth, fifth, and sixth subjects—namely, General Work, Mining Machinery, Surveying and Levelling; and 70 per cent. of the marks obtainable for the whole examination.

33. A candidate for a Second-class Certificate of Competency must obtain 70 per cent. of the marks obtainable for the first three papers, Mining Act and Rules, Mine Gases, and Mine Ventilation; and 60 per cent. for the fourth subject, General Work; and 70 per cent. of the marks obtainable for the whole examination.

34. A candidate for a Third-class Certificate of Competency must obtain not less than 65 per cent. of the marks obtainable on the first subject, Mining Act and Rules and Mine Gases; not less than 60 per cent. of the marks obtainable on the second paper, Ventilation and General Work; and not less than 65 per cent. of the marks obtainable for the whole examination.

35. A candidate for a Mine Surveyor's Certificate of Competency must obtain 70 per cent. of the marks obtainable for the whole examination.

No examination having been held in 1919 prior to the appointment of the Board of Examiners, it was decided to hold an examination for certificates of competency as coal-mine officials on the 26th, 27th, and 28th days of August, 1919, and that the examination be held simultaneously at Nanaimo, Cumberland, Merritt, and Fernie.

In view of the following regulation made, pursuant to the provisions of the "Coal-mines Regulation Act," by the Lieutenant-Governor in Council, it was decided to hold an examination for mine surveyors' certificates of competency at the above places on the 28th of August, 1919:—

REGULATION.

1. After the 1st day of October, 1919, all plans required to be kept in accordance with the provisions of the "Coal-mines Regulation Act" shall be made of durable material, and the surveying of mines and the preparation of mine-plans shall be done by a person or persons holding a certificate granted under the provisions of the "Coal-mines Regulation Act" and Amendment Acts.

2. In no case shall a certificate be granted to any applicant until he has satisfied the Board of Examiners that:—

(1.) He has had two years' practical experience in the surveying of mines, or is the holder of a diploma in scientific and mining training after a course of study of at least two years at an educational institute approved by the Minister of Mines, or has taken a degree in scientific mining subjects at a university so approved:

(2.) He is competent:—
(*a.*) To make an accurate survey of the workings of a coal-mine and to connect such survey with a surface survey:
(*b.*) To make accurate survey and levellings:
(*c.*) To plot accurately surveys and levellings:

(3.) He has given satisfactory evidence of his sobriety and general good conduct.

3. Each plan required to be kept in accordance with the provisions of the "Coal-mines Regulation Act" shall have inserted on it the date on which the last survey was made and the signature of the person making such survey.

4. A certificate authorizing any person to act as mine surveyor may be granted to such person without written examination if the Board of Examiners reports that he has the necessary experience, and provided application is made for such certificate before the 1st day of December, 1919.

5. Every person who violates any rule or regulation under the "Coal-mines Regulation Act" or Amendment Acts shall be guilty of an offence against the "Coal-mines Regulation Act," and liable to the penalties and obligations imposed by the said Act.

The total number of candidates at this examination was as follows: For first-class certificates, 11 (2 passed, 9 failed); for second-class, 5 (2 passed, 3 failed); for third-class, 5 (3 passed, 2 failed); for mine surveyors, 9 (6 passed, 3 failed); making a total of 30.

The work of the candidates, with a few exceptions, was poor, and showed a lack of preparation and want of knowledge that is inconsistent with present-day requirements.

The candidates appear to give more attention to memorizing formulæ of more or less doubtful value than to the fundamental principles of mining.

It is the intention of the Board to maintain a high standard, so intending candidates, to gain a certificate of competency of any class, must devote more time to study and preparation.

The examinations will in future be held in the months of May and November.

The following is a list of the candidates who successfully passed the examination in the various classes:—

LIST OF CANDIDATES TO WHOM CERTIFICATES OF COMPETENCY WERE ISSUED AT THE EXAMINATIONS HELD IN AUGUST, 1919, AT NANAIMO, CUMBERLAND, MERRITT, AND FERNIE.

First-class Candidates.—Samuel David Wark and John McDonald.

Second-class Candidates.—John Smith, B 231; George Murray, B 232.

Third-class Candidates.—Alfred Davies, C 691; James Seddon, C 692; John Devlin, C 693.

Mine Surveyors' Certificates.—Thomas Wright Scott, Joseph Patrick Boyce, Robert McCulloch, Frederick William Reger, William Dixon Vallance, and William Holdsworth.

The Board recommended that the Honourable the Minister of Mines grant a certificate of competency as mine surveyor to the following applicants, each of whom applied for a certificate of competency as mine surveyor without written examination, according to section 41 of the "Coal-mines Regulation Act" and amendments, before December 1st, 1919, and satisfied the Board that they had the necessary experience: George Wilkinson, James Dickson, Maurice Wilbur Garman, Joseph Richardson Roaf, James A. Richards, Albert Crompton Lymn, Charles Clifton Richards, James Delaney, Peter Lancaster, Harold White, Alfred George King, Jr., George W. B. Daniell, Neville F. Townsend, P. W. Gregory, Harry Ernest Miard, William Arthur Owen, Ridgeway Robinson Wilson, Arthur Rupert Wilson, Wynne Jeffreys Baile, James Ridley, Samuel David Wark, Charles James Wilson, Hartley Paul Wilson, Octavius B. N. Wilkie, Gerald D. Davis, George Hunter, and James Hargreaves.

In addition to the above, there were several applications received prior to December 1st, 1919, in support of which the applicants did not provide sufficient proof to satisfy the Board that they had the necessary experience. These applicants were advised to provide further proof of experience in order that the Board may decide whether the applicant has the necessary qualifications.

The Board has also received several applications for certificates of competency as mine officials without written examination in accordance with the amended section 42, chapter 160, "Coal-mines Regulation Act":—

"The Minister may sign and deliver a certificate without written examination to an applicant who, being a British subject, is the holder of a certificate granted in any British Dominion if the Board reports that the standard of training required for the granting of such certificate is equivalent to that required for the granting of a corresponding certificate under this Act, and that after oral examination of the applicant it is satisfied with his qualifications."

The Board, however, has not had sufficient time to make itself familiar with the standards of training in the different parts of the Empire which grant certificates of competency as coal-mine officials, and has deferred action until it has sufficient knowledge of the different examination centres to enable it to make a proper decision on any application coming before it.

Any prospective candidates may, on application, have copies of the questions set at previous examinations by applying to the Board of Examiners at Victoria, B.C.

REGISTERED LIST OF HOLDERS OF CERTIFICATES OF COMPETENCY AS COAL-MINE OFFICIALS.

FIRST-CLASS CERTIFICATES—SERVICE CERTIFICATES ISSUED UNDER SECTION 39, "COAL MINES REGULATION ACT, 1877."

Edward G. Prior. James Dunsmuir, Victoria. Thomas A. Buckley.

FIRST-CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL MINES REGULATION ACT, 1897."

NAME.	DATE.
Shepherd, Francis H	March 5th, 1881
Honobin, William	May 1st, 1882
Little, Francis D	May 1st, 1882
Chandler, William	December 21st, 1883
Priest, Elijah	December 21st, 1883
McGregor, James	January 18th, 1888
Randle, Joseph	January 18th, 1888
Matthews, John	January 8th, 1889
Norton, Richard Henry	August 26th, 1889
Bryden, Andrew	December 30th, 1889
Sharp, Alexander	October 27th, 1891
Kesley, John	March 4th, 1892
Wall, William H	May 30th, 1896
Morgan, Thomas	May 30th, 1896
Wilson, David	May 30th, 1896
Smith, Frank B	May 30th, 1896
Bradshaw, George B	June 12th, 1899
Simpson, William G	June 12th, 1899
Hargreaves, James	February 5th, 1901
Drinnan, Robert G	February 5th, 1901
Stockett, Thomas, Jr	August 3rd, 1901
Cunliffe, John	August 3rd, 1901
Evans, Daniel	August 3rd, 1901
McEvoy, James	October 17th, 1902
Wilson, A. R.	October 17th, 1902
Simister, Charles	October 17th, 1902
Budge, Thomas	October 17th, 1902
Mills, Thomas	October 17th, 1902
Faulds, Alexander	October 17th, 1902
Richards, James A.	October 17th, 1902
McLean, Donald	January 21st, 1904
Wilkinson, Geo	January 21st, 1904
Wright, H. B.	January 21st, 1904
Coulthard, R. W	January 21st, 1904
Roaf, J. Richardson	January 21st, 1904
John, John	January 21st, 1904
Manley, H. L	January 21st, 1904
Battey, Richard	May 27th, 1913
Baxter, Andrew	June 10th, 1911

First-class Certificates issued under "Coal Mines Regulation Act Further Amendment Act, 1904."

Name.	Date.	Name.	Date.
Biggs, J. G.	July 22, 1908	McGuckie, Thomas	July 22, 1908
Bonar, Robert	Oct. 28, 1911	McKendrick, Andrew	May 27, 1913
Brace, Tom	May 13, 1915	McMillan, J. H.	Sept. 10, 1910
Bridge, Edward	July 22, 1908	McVicar, Samuel	May 1, 1909
Brown, David	May 21, 1914	Mazey, William John	Oct. 31, 1912
Brown, Robert Joyce	May 13, 1915	Miard, Henry Ernest	May 9, 1912
Caufield, Bernard	May 1, 1909	Michell, Dudley	Nov. 15, 1917
Church, James A. H.	June 10, 1911	Millar, John K.	Nov. 22, 1906
Cox, Richard	May 13, 1915	Miller, Andrew Anderson	Oct. 31, 1912
Crowder, James	June 10, 1911	Montgomery, John W.	May 1, 1909
Cunningham, John Howard	May 9, 1912	Moore, Wm. H.	May 17, 1917
Davidson, W. A.	May 1, 1909	Mordy, Thomas	Sept. 10, 1910
Davies, David	June 10, 1911	Mottishaw, Sam. K.	Nov. 15, 1917
Davies, Stephen	Nov. 15, 1917	Newton, John	July 22, 1908
Davies, Thos. Owen	May 21, 1914	O'Brien, George	May 21, 1914
de Hart, J. B.	May 17, 1917	Ovington, John	May 27, 1913
Derbyshire, James	Nov. 9, 1907	Peacock, Frank David	Oct. 28, 1911
Devlin, Henry	May 1, 1909	Penman, Hugh	May 21, 1914
Dickson, James	Oct. 31, 1912	Phelan, Arthur	May 27, 1913
Elliott, Daniel	Nov. 9, 1907	Powell, J. W.	June 10, 1911
Emmerson, Joseph	Nov. 9, 1907	Quinn, John Graham	July 8, 1916
Fairfoull, Robert	June 10, 1911	Ramsay, Peter Millar	May 16, 1918
France, Thos.	Nov. 22, 1906	Roper, William	May 13, 1915
Fraser, Norman	Mar. 4, 1905	Russell, John	May 21, 1914
Freeman, H. N.	May 1, 1909	Shanks, John	May 1, 1909
Galloway, C. F. J.	July 22, 1908	Shaw, William	May 9, 1912
Garman, Morris W	Nov. 15, 1917	Shenton, T. J.	Sept 10, 1910
Gascoyne, Rowland B.	May 21, 1914	Shone, Samuel	May 1, 1909
Glover, Francis	Oct. 31, 1912	Smith, A. E.	Oct. 28, 1911
Graham, Charles	Nov. 14, 1905	Smith, Joseph	July 22, 1908
Graham, Thomas	Nov. 9, 1907	Smith, Thos. Edwin	Dec. 19, 1918
Gray, James	Nov. 27, 1909	Spicer, J. E.	Oct. 28, 1911
Henderson, Robert	Nov. 27, 1909	Spruston, T. A.	Nov. 27, 1909
Hewlett, Howe	May 27, 1913	Stevens, L. C.	Nov. 27, 1909
Higgins, Alexander	Dec. 19, 1918	Stewart, R. T.	Sept. 10, 1910
Holden, James	May 1, 1909	Strachan, Robert	Mar. 4, 1905
Howden, Archibald	May 27, 1913	Strang, James	June 10, 1911
Howells, Nathaniel	Oct. 28, 1911	Taylor, James	May 16, 1918
Hughes, John C.	May 17, 1917	Thomas, J. D.	Sept. 10, 1910
Humphries, Clifford	June 10, 1911	Thorne, B. L.	Sept. 10, 1910
Hunter, Alex. B.	July 8, 1916	Touhey, James	May 21, 1914
Jackson, Thos. R.	Nov. 9, 1907	Walker, William	May 16, 1918
James, William	July 22, 1908	Wallbank, J.	Sept. 10, 1910
Jaynes, Frank	May 13, 1915	Warburton, Ernest Leonard	July 8, 1916
Jemson, Jas. W.	May 27, 1913	Wark, Samuel David	Oct. 3, 1919
Kellock, George	June 10, 1911	Wesnedge, William	Dec. 19, 1918
Knox, T. K.	July 27, 1909	Whittaker, John	Dec. 19, 1918
Laird, Robert	Nov. 15, 1917	Williams, John Samuel	Dec. 19, 1918
Lancaster, William	July 22, 1908	Williams, Thos. B.	May 17, 1917
Leighton, Henry	May 9, 1912	Williams, Thos. H.	Nov. 22, 1906
Macauley, D. A.	June 10, 1911	Wilson, Ridgeway R.	Nov. 15, 1917
McCulloch, James	Sept. 10, 1910	Wilson, William	May 16, 1918
McDonald, John	Oct. 3, 1919	Wylie, John	July 22, 1908

Second-class Certificates of Service.

Name.	Date.	Cer. No.	Name.	Date.	Cer. No.
Lee, John S.	March 4, 1905	B 9	Hunt, John	March 4, 1905	B 13
Millar, J. K.	March 4, 1905	B 10	Walker, David	March 4, 1905	B 14
McCliment, John	March 4, 1905	B 11	Powell, William Baden	March 4, 1905	B 16
Martin, David	March 4, 1905	B 12	Bryden, Alexander	March 4, 1905	B 18

SECOND-CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904."

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Adamson, Robert	Sept. 10, 1910	B 120	Gillespie, John	Oct. 23, 1906	B 36
Allan, Alex. McDairmid	May 27, 1913	B 167	Gould, Alfred	May 13, 1915	B 190
Almond, Walter	Nov. 15, 1917	B 213	Gourlay, Robert	Dec. 19, 1918	B 227
Barclay, Andrew	July 29, 1905	B 25	Graham, Chas	Mar. 4, 1905	B 1
Barlow, Benjamin Robert	Dec. 19, 1918	B 229	Gray, David	May 1, 1909	B 76
Baybutt, Thomas	July 8, 1916	B 206	Gray, George	July 8, 1916	B 207
Bell, John	May 17, 1917	B 212	Greenwell, Archibald	May 16, 1918	B 220
Bevis, Nathaniel	Sept. 10, 1910	B 123	Hamilton, Robert N	May 21, 1914	B 175
Biggs, John	May 1, 1909	B 94	Hastings, Andrew Peacock	Dec. 19, 1918	B 223
Biggs, John G	Nov. 2, 1907	B 40	Henderson, Robert	July 22, 1908	B 60
Blair, James	May 13, 1915	B 197	Holliday, William	Dec. 19, 1918	B 230
Brace, Tom	Nov. 27, 1909	B 96	Horrocks, Abner G	June 10, 1911	B 130
Bridge, Edward	Oct. 23, 1906	B 33	Howells, Nathaniel	Nov. 27, 1909	B 97
Brown, David	Sept. 10, 1910	B 108	Huby, Norman W	May 13, 1915	B 198
Brown, George	Dec. 19, 1918	B 225	Hudson, George	Sept. 10, 1910	B 121
Brown, James L	Oct. 28, 1911	B 136	Hughes, John C	Sept. 10, 1910	B 109
Brown, John C	Oct. 23, 1906	B 39	Hutton, Isaac	May 21, 1914	B 185
Brown, John Todd	May 9, 1912	B 150	Hutton, John	May 9, 1912	B 154
Brown, R. J	Oct. 28, 1911	B 134	Jackson, Thos. R	Mar. 4, 1905	B 5
Brown, Robert	May 21, 1914	B 183	James, David	Nov. 2, 1907	B 58
Brown, Robert Sneddon	May 13, 1915	B 196	Jarrett, Fred	May 1, 1909	B 84
Brown, William Gold	Dec. 19, 1918	B 228	Jaynes, Frank	Sept. 10, 1910	B 111
Brownrigg, John H	May 17, 1917	B 124	John, Francis	July 8, 1916	B 200
Bushell, J. P	May 1, 1909	B 81	John, Howell	Sept. 10, 1910	B 122
Carroll, Henry	July 22, 1908	B 62	Johnson, Moses	May 1, 1909	B 75
Caufield, Bernard	Oct. 23, 1906	B 30	Jones, Samuel	May 16, 1918	B 221
Caufield, John	July 8, 1916	B 199	Jones, William T	July 22, 1908	B 66
Cawthorne, L	May 1, 1909	B 93	Jordon, Thos	Nov. 27, 1909	B 104
Challinor, Jno. Thomas	May 27, 1913	B 169	Joyce, Walter	May 27, 1913	B 168
Challoner, Jno. Arthur	May 21, 1914	B 178	Kirkwood, John Robertson	Oct. 31, 1912	B 160
Churchill, James	July 22, 1908	B 65	Knowles, James E	Oct. 28, 1911	B 137
Clarkstone, Wm. W	May 21, 1914	B 180	Laird Robert	May 17, 1917	B 210
Commons, Wm.	Sept. 10, 1910	B 115	Lancaster, William	Nov. 2, 1907	B 50
Coupland, George	May 16, 1918	B 217	Lander, Frank	May 13, 1915	B 195
Courtney, A. W	Oct. 28, 1911	B 138	Lane, Joseph	May 9, 1912	B 142
Cox, Richard	May 9, 1912	B 143	Lee, Robert John	Sept. 10, 1910	B 110
Crawford, David	May 1, 1909	B 88	Littler, Matthew	Oct. 31, 1912	B 157
Cunliffe, Thomas	May 1, 1909	B 78	Luck, George	June 10, 1911	B 128
Dando, John	May 27, 1913	B 164	Manifold, Albert	May 9, 1912	B 145
Daniels, David	Nov. 2, 1907	B 53	Marsh, John	Nov. 15, 1917	B 216
Derbyshire, James	Oct. 23, 1906	B 32	Mason, Joseph	May 13, 1915	B 193
Davidson, Hugh	May 27, 1913	B 165	Massey, H	Nov. 27, 1909	B 99
Davies, Stephen	Sept 10, 1910	B 113	Mather, Thomas	June 10, 1911	B 127
Dennis, Fred. W	May 21, 1914	B 174	Matusky, A	May 1, 1909	B 91
Devlin, Ernest H	May 21, 1914	B 179	Mayer, Ralph Waldo	May 9, 1912	B 144
Devlin, Henry	Nov. 2, 1907	B 44	Mazay, W. J	Nov. 27, 1909	B 101
Dewar, Alexander	Oct. 31, 1912	B 162	Merryfield, William	July 22, 1908	B 61
Dickenson, Clifford	May 13, 1915	B 189	Miard, Hy. E	Sept. 10, 1910	B 107
Dunsmuir, John	Nov. 14, 1905	B 26	Michek, John	May 17, 1917	B 188
Dykes, J. W	May 1, 1909	B 77	Michell, Dudley	May 13, 1915	B 187
Eccleston, Wm	May 1, 1909	B 87	Middleton, Robert	July 22, 1908	B 72
Fairfoull, James	May 21, 1914	B 186	Mitchell, Henry	July 8, 1916	B 201
Fairfoull, R	May 1, 1909	B 83	Monks, James	Nov. 2, 1907	B 55
Finlayson, James	July 29, 1905	B 21	Moore, Wm. H	May 21, 1914	B 173
Ford, Allan	May 27, 1913	B 171	Morgan, John	Nov. 2, 1907	B 43
Foster, W. R	Nov. 27, 1909	B 102	Morgan, William	Dec. 19, 1918	B 224
France, Thos	May 14, 1905	B 27	Morris, John	July 22, 1908	B 67
Francis, David M	May 21, 1914	B 182	Morton, Robert W	July 22, 1908	B 59
Francis, Enoch	May 1, 1909	B 86	Mottishaw, S. K	Oct. 28, 1911	B 135
Francis, James	July 22, 1908	B 63	Murray, George	Oct. 3, 1919	B 232
Frater, George	July 8, 1916	B 204	Musgrave, J	May 1, 1909	B 90
Freeman, Henry N	Nov. 2, 1907	B 45	Myers, Peter	May 9, 1912	B 149
Garbett, Richard	Oct. 31, 1912	B 161	McDonald, J. A	Oct. 28, 1911	B 133
Garman, Morris Wilbur	Oct. 31, 1912	B 155	McDonald, John	May 27, 1913	B 172
Gillespie, Hugh	July 29, 1905	B 24	McFegan, W	Nov. 31, 1909	B 106

SECOND-CLASS CERTIFICATES OF COMPETENCY ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
McGarry, Martin	Oct. 31, 1912	B 156	Smith, John	Oct. 3, 1919	B 231
McGuckie, Thomas M.	Oct. 23, 1906	B 35	Somerville, Alex.	Mar. 4, 1905	B 4
McKelvie, J.	May 1, 1909	B 92	Spruston, Robert Lecce.	July 8, 1916	B 202
McKendrick, And.	Sept. 10, 1910	B 112	Spruston, Thos. A.	Nov. 2, 1907	B 46
McMillan, D.	June 10, 1911	B 125	Stafford, Matthew	June 10, 1911	B 131
McNay, Carmichael.	May 9, 1912	B 151	Stewart, J. M.	May 1, 1909	B 95
McPherson, James E.	July 22, 1908	B 73	Stobbart, Jacob.	May 9, 1912	B 153
Neen, Joseph.	June 10, 1911	B 129	Stockwell, William	Nov. 2, 1907	B 56
Newbury, Arthur	May 21, 1914	B 184	Strang, Thomas	Oct. 31, 1912	B 158
Newton, John	Oct. 23, 1906	B 31	Sutherland, John	May 16, 1918	B 218
Newton, Wm.	Sept. 10, 1910	B 116	Taylor, James	May 13, 1915	B 194
O'Brien, Charles	May 9, 1912	B 148	Taylor, Thomas	July 8, 1916	B 203
O'Brien, George	May 1, 1909	B 82	Thomas, J. B.	Nov. 27, 1909	B 105
Ovington, John	Nov. 2, 1907	B 52	Thomas, Joseph D.	Oct. 23, 1906	B 38
Parkinson, T.	May 1, 1909	B 80	Thompson, Joseph	Sept. 10, 1910	B 114
Parnham, Charles.	Nov. 2, 1907	B 49	Touhey, James	May 9, 1912	B 147
Quinn, James.	May 21, 1914	B 181	Touhey, William	July 8, 1916	B 205
Quinn, John	May 9, 1912	B 146	Tonge, Thomas	July 22, 1908	B 71
Ramsay, Peter Millar	May 17, 1917	B 209	Tully, Thomas	Nov. 15, 1917	B 214
Rankin, Geo.	Nov. 27, 1909	B 103	Vanhulle, Peter.	Nov. 2, 1907	B 54
Raynes, M. T.	Oct. 28, 1911	B 139	Virgo, John	May 1, 1909	B 89
Reid, Wm.	Oct. 28, 1911	B 132	Walker, William	May 13, 1915	B 192
Renny, James.	Oct. 28, 1911	B 140	Warburton, Ernest L.	May 27, 1913	B 170
Richards, Thomas.	Nov. 2, 1907	B 57	Watson, Adam G.	Nov. 14, 1905	B 28
Richards, Samuel	May 9, 1912	B 152	Watson, Arthur W.	May 17, 1917	B 211
Rigby, John	July 29, 1905	B 29	Webber, John Frank	Mar. 4, 1905	B 3
Roberts, Ebenezer	Sept. 10, 1910	B 117	Wesnedge, William.	Nov. 27, 1909	B 98
Robinson, William.	July 22, 1908	B 69	White, John	Nov. 2, 1907	B 48
Rogers, George	May 1, 1909	B 79	Whitehouse, William	Oct. 31, 1912	B 163
Roper, William.	May 9, 1912	B 141	Williams, John Samuel.	Nov. 15, 1917	B 215
Rowbottom Thomas.	May 16, 1918	B 222	Wilson, Robinson.	May 21, 1914	B 177
Russell, John	Nov. 2, 1907	B 47	Wilson, Thomas	July 22, 1908	B 74
Rutherford, Jasper.	May 16, 1918	B 219	Wilson, William.	July 22, 1908	B 70
Scarpino, Francis.	Dec. 19, 1918	B 226	Wood, Thos. James.	May 21, 1914	B 176
Shanks, David.	Oct. 31, 1912	B 159	Worthington, Joseph.	May 1, 1909	B 85
Shaw, Thomas John.	May 27, 1913	B 166			

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904."

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Adamson, Robert	May 1, 1909	C 323	Bateman, Joseph William.	Oct. 28, 1913	C 551
Ainsworth, Edward	May 16, 1918	C 674	Bauld, Wm	June 10, 1911	C 422
Allan, Alexander	Oct. 28, 1911	C 430	Baxter, Robert.	Oct 28, 1911	C 450
Almond, Alex.	Oct. 1, 1907	C 252	Baybutt, Thomas.	May 27, 1913	C 548
Almond, Walter	July 22, 1908	C 286	Beeton, D. H.	May 1, 1909	C 338
Anderson, John.	Oct. 28, 1911	C 437	Bell, Fred	May 27, 1913	C 514
Anderson, Peter Blane	Nov. 15, 1917	C 660	Bell, John	May 9, 1912	C 477
Anderson, Robt.	Oct. 14, 1914	C 599	Bennett, Andrew M.	Nov. 15, 1917	C 661
Angell, William	May 21, 1914	C 591	Bennett, John.	Oct. 14, 1914	C 597
Arbuckle, John.	May 13, 1915	C 622	Bennie, John.	June 10, 1911	C 411
Archibald, Geo.	May 21, 1914	C 569	Beveridge, Wm.	June 10, 1911	C 396
Archibald, Thomas.	Oct. 28, 1911	C 454	Biggs, John.	Mar. 4, 1905	C 210
Ball, Alfred	May 17, 1917	C 635	Biggs, Thomas	Oct. 28, 1911	C 449
Bann, Thomas.	Oct. 31, 1912	C 494	Birchell, Richard.	Oct. 1, 1907	C 266
Baggaley, J.	July 22, 1908	C 300	Blair, James	Oct. 31, 1912	C 502
Bain, James	May 27, 1913	C 546	Blewett, Ernest	July 22, 1908	C 298
Ball, Benjamin	May 21, 1914	C 583	Blinkhorn, Thomas	Dec. 19, 1918	C 681
Barker, Robert	June 10, 1911	C 415	Bradley, William.	July 22, 1908	C 291
Barlow, B. R.	May 1, 1909	C 337	Bridge, Edward	July 29, 1905	C 223

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Briscoe, F.	July 22, 1908	C 309	Doherty, J. J.	May 1, 1909	C 340
Broderick, Matthew	Jan. 21, 1913	C 525	Doney, John	Mar. 4, 1905	C 211
Brown, Arthur A.	Oct. 14, 1914	C 596	Donnachie, John	June 10, 1911	C 425
Brown, David	Nov. 1, 1909	C 348	Doodson, Robert	Oct. 28, 1911	C 455
Brown, George	July 8, 1916	C 626	Dorrance, Orlin William	Jan. 21, 1913	C 517
Brown, James	Sept. 10, 1910	C 364	Douglas, D. B.	Oct. 23, 1906	C 235
Brown, James	June 10, 1911	C 412	Dow, And. Y.	May 21, 1914	C 587
Brown, James	July 8, 1916	C 625	Dunn, Wm.	Oct. 14, 1914	C 606
Brown, Jas. Millie	May 13, 1915	C 615	Dykes, Isaac	June 10, 1911	C 409
Brown, John	Sept. 10, 1910	C 392	Dykes, Joseph W.	Oct. 1, 1907	C 248
Brown, Robert	Oct. 28, 1911	C 451	Eccleston, Thomas	May 17, 1917	C 482
Brown, Robert D.	June 10, 1911	C 423	Edwards, John	May 27, 1913	C 542
Brown, Robert S.	June 10, 1911	C 408	Elliott, John	May 27, 1913	C 541
Brown, Wm. A.	May 21, 1914	C 576	Elmes, George	Oct. 31, 1912	C 511
Brown, William Gold	July 8, 1916	C 629	Evans, D.	July 22, 1908	C 284
Bullen, Thomas	Sept. 10, 1910	C 379	Ewing, Robert	May 13, 1915	C 608
Bushell, Jas. P.	Oct. 1, 1907	C 264	Fairfoull, James	Oct. 28, 1911	C 453
Bysouth, Thomas	May 16, 1918	C 673	Farrow, John William	Dec. 19, 1918	C 683
Cairns, Andrew	June 10, 1911	C 420	Fitzpatrick, T. J	Oct. 2, 1911	C 452
Cairns, Robert	May 27, 1913	C 539	Flockart, David	Jan. 21, 1913	C 531
Caldwell, Daniel	May 17, 1917	C 639	Ford, Allen	Oct. 28, 1911	C 445
Calverly, Joseph	Sept. 10, 1910	C 375	Fowler, Robert	Oct. 31, 1912	C 495
Camamile, Hollis	Oct. 28, 1911	C 443	Francescini, Louis	May 16, 1918	C 672
Campbell, Samuel	Nov. 15, 1917	C 662	Francis, David Morgan	Oct. 28, 1913	C 558
Carr, Peter	Oct. 31, 1912	C 497	Francis, James	Oct. 1, 1907	C 250
Carson, George	Mar. 17, 1917	C 663	Frater, George	May 13, 1915	C 616
Catchpole, Charles	July 29, 1905	C 227	Freeman, H. N.	Nov. 14, 1905	C 230
Caufield, Edward	May 16, 1918	C 670	Frew, Andrew	Nov. 27, 1909	C 360
Caufield, John	May 1, 1909	C 321	Frodsham, Vincent	July 22, 1908	C 282
Challoner, Arthur	Oct. 28, 1911	C 433	Furbow, John	Jan. 21, 1913	C 528
Charnock, John	Nov. 15, 1917	C 653	Garbett, Richard	Sept. 10, 1910	C 377
Cheetham, Ben	July 22, 1908	C 311	Gascoyne, Rowland B.	Jan. 21, 1913	C 513
Chester, John	Oct. 28, 1911	C 440	Geater, Jas. Gordon	May 21, 1914	C 573
Clark, Lewis	June 10, 1911	C 405	Gemmell, James	Oct. 31, 1912	C 505
Clark, Walter Pattison	May 9, 1912	C 480	Gillham, John	May 13, 1915	C 623
Clarkstone, Wm. W.	Oct. 28, 1911	C 431	Gillies, William	May 16, 1918	C 668
Cleaves, Walter	May 9, 1912	C 475	Glenn, James	Oct. 28, 1911	C 435
Clifford, William	July 22, 1908	C 313	Gordon, Davis John	May 9, 1912	C 474
Colgrove, Charles Henry	Dec. 19, 1918	C 679	Gourley, Robert	May 9, 1912	C 470
Commons, William	July 22, 1908	C 304	Gray, George	May 9, 1912	C 467
Cooke, Joseph	Mar. 4, 1905	C 209	Green, William	Nov. 15, 1917	C 659
Coomb, Alexander	May 27, 1913	C 533	Greenhorn, John	May 21, 1914	C 575
Cooper, John Andrew	Dec. 19, 1918	C 689	Griffiths, Edward	Oct. 31, 1914	C 508
Cope, Frank	Oct. 28, 1913	C 549	Gunniss, Matthew	May 9, 1912	C 460
Coulthard, James	June 10, 1911	C 407	Hallinan, William	May 1, 1909	C 343
Crawford, David	Mar. 4, 1905	C 208	Halsall, J.	July 22, 1908	C 307
Cunningham, G. F.	Nov. 11, 1905	C 229	Hamilton, John	Oct. 28, 1911	C 444
Cunliffe, Thos	Oct. 1, 1907	C 265	Hamilton, Robert Nesbitt	Oct. 28, 1913	C 550
Dabb, Owen	May 21, 1914	C 578	Hampton, Samuel	Nov. 15, 1917	C 650
Dando, John	May 9, 1912	C 465	Hancock, Arthur	Nov. 15, 1917	C 656
Davidson, Hugh	May 9, 1912	C 464	Hartley, Thomas	Oct. 31, 1912	C 510
Davies, Alfred	Oct. 3, 1919	C 691	Harwood, Fred	Sept. 10, 1910	C 384
Davies, Evan Thomas	May 9, 1912	C 463	Harvey, Thomas	May 9, 1912	C 466
Davis, John David	May 16, 1918	C 669	Harvie, George	Sept. 10, 1910	C 378
Davis, William	May 1, 1909	C 339	Heaps, Robert	Sept. 10, 1910	C 373
Dean, Andrew	Dec. 19, 1918	C 688	Hemer, Herbert	Oct. 14, 1914	C 595
Dean, Joseph	May 13, 1915	C 611	Henney, Jonathan	June 10, 1911	C 424
Derbyshire, A.	June 10, 1911	C 401	Hendry, James	May 9, 1912	C 471
Dewar, Alex.	Sept. 10, 1910	C 369	Herd, William	Dec. 19, 1918	C 682
Devlin, Edward	Oct. 23, 1906	C 241	Heyes, Edward	May 1, 1909	C 320
Devlin, Ernest Henry	May 27, 1913	C 538	Hill, Isaac	Nov. 15, 1917	C 664
Devlin, John	Oct. 3, 1919	C 693	Hilley, Fred	July 22, 1908	C 290
Devoy, William	May 17, 1917	C 638	Hilton, Mathias	Dec. 19, 1918	C 677
Dickenson, Clifford	May 27, 1917	C 532	Hilton, R. G.	Sept. 10, 1910	C 376
Dingsdale, Geo.	Oct. 28, 1911	C 459	Hodson, R. H.	Mar. 4, 1905	C 216

Third-class Certificates issued under "Coal Mines Regulation Act Further Amendment Act, 1904"—*Continued.*

Name.	Date.	Cer. No.	Name.	Date.	Cer. No.
Holdsworth, William	May 16, 1918	C 671	Maxwell, Geo.	May 21, 1914	C 571
Holliday, William	July 8, 1916	C 634	McAlpine, John	Mar. 4, 1905	C 217
Horbury, Joseph W.	June 10, 1911	C 406	McArthur, John Malcolm	May 17, 1917	C 648
Horrocks, A. G.	May 1, 1909	C 324	McBroom, Al.	July 2, 1908	C 287
Horwood, S	July 22, 1908	C 312	McCourt, John	Oct. 14, 1914	C 605
Houston, Robert	July 8, 1916	C 631	McCulloch, James	May 1, 1909	C 315
Howells, Nathaniel	May 1, 1909	C 316	McDonald, John	Oct. 28, 1911	C 448
Huby, Norman	June 10, 1911	C 394	McFagen, Alexander	May 9, 1912	C 490
Hutchison, Ben	Nov. 14, 1905	C 232	McFegan, W.	May 1, 1909	C 319
Hutchison, Fred.	Nov, 27, 1909	C 358	McGarry, Martin	May 1, 1909	C 326
Hynds, William	July 8, 1916	C 632	McGrath, James	July 8, 1916	C 630
Ireson, John	Oct. 31, 1912	C 507	McGuckie, Jno. M	May 21, 1914	C 562
Irvine, David	June 10, 1911	C 413	McGuckie, Thomas	July 29, 1905	C 226
Jack, John	May 21, 1914	C 582	McGuire, Thomas	Oct. 28, 1913	C 553
James, Thos.	May 21, 1914	C 588	McIntyre, Neil	May 21, 1914	C 574
Jardine, George Edward	Jan. 21, 1913	C 521	McKelvie, J.	July 22, 1908	C 285
Jarrett, Fred. J.	Oct. 1, 1907	C 256	McKenzie, Peter	June 10, 1911	C 427
Jaynes, Frank	July 22, 1908	C 277	McKibben, Matthew	May 21, 1914	C 580
Jemson, J. W.	Mar. 4, 1905	C 205	McKinley, John	Oct. 28, 1914	C 442
Jenkins, John	Sept. 10, 1910	C 390	McLaughlin, James	May 9, 1912	C 485
John, Howel	July 22, 1908	C 305	McLachlan, Alex.	June 10, 1912	C 419
Johnson, Moses.	Oct. 1, 1907	C 258	McLean, M. D.	Sept. 10, 1910	C 389
Johnston, Robert	May 9, 1912	C 479	McLellan, William	Mar. 4, 1905	C 219
Jones, Alf. Geo.	May 21, 1914	C 584	McLeod, James	July 22, 1908	C 296
Jones, Samuel	May 27, 1913	C 518	McLeod, John	May 13, 1915	C 609
Jones, William C.	Jan. 21, 1913	C 556	McMeakin, James	May 13, 1915	C 612
Jones, William Ernest	Oct. 28, 1913	C 221	McMillan, D.	Sept. 10, 1910	C 363
Jones, W. T.	Mar. 4, 1905	C 544	McMillan, Edward	Oct. 31, 1912	C 493
Joyce, Walter	Nov. 27, 1909	C 361	McMillan, Neil.	Nov. 15, 1917	C 654
Judge, Peter	Sept. 10, 1910	C 391	McNay, Carmichael	July 22, 1908	C 306
Keenan, Wm. James	June 10, 1911	C 426	McNeill, Adam L.	July 22, 1908	C 281
Kelly, Ernest	May 17, 1917	C 646	McNeill, Robert	Sept. 10, 1910	C 387
Kemp, Wm.	Oct. 14, 1914	C 594	Meek, Matthew	May 9, 1912	C 484
Kingham, Alfred	Oct. 28, 1913	C 559	Meikle, Harry Alexander	July 8, 1916	C 627
Kirkeberg, H. S.	Nov. 27, 1909	C 350	Merrifield, George	Oct. 23, 1906	C 239
Lancaster, William	Oct. 23, 1906	C 243	Merrifield, William	Oct. 23, 1906	C 236
Lane, Joseph	Oct. 1, 1907	C 254	Michek, John.	May 21, 1914	C 563
Leeman, T.	May 1, 1909	C 345	Miles, John	June 10, 1911	C 414
Lewis, Benj. J.	Sept. 10, 1910	C 386	Mitchell, Charles.	May 1, 1909	C 322
Leynard, Paul	May 17, 1917	C 637	Mitchell, Henry	Sept. 10, 1910	C 366
Liddle, John	July 29, 1905	C 228	Monks, James	Nov. 14, 1905	C 234
Lindsay, William	May 17, 1917	C 642	Moore, George.	Oct. 23, 1906	C 242
Littler, John	June 10, 1911	C 410	Moore, John.	May 1, 1909	C 335
Littler, Matthew	June 10, 1911	C 417	Moreland, Thomas	July 22, 1908	C 299
Littler, Robert.	June 10, 1911	C 418	Morgan, John	July 29, 1905	C 224
Livingstone, Alex.	Oct. 28, 1911	C 436	Morgan, William.	May 17, 1917	C 636
Loxton, George	June 10, 1911	C 428	Morris, David	May 9, 1912	C 472
Loxton, John.	June 10, 1911	C 416	Mottishaw, Samuel K.	Oct. 23, 1906	C 237
Luck, George.	May 1, 1909	C 318	Murdock, Jno. Y.	May 21, 1914	C 564
Lynch, Stewart	Oct. 28, 1911	C 432	Myers, Peter	Oct. 28, 1911	C 446
Mackie, John.	June 10, 1911	C 421	Nanson, T. H.	July 22, 1908	C 280
Makin, J. Wm.	Sept. 10, 1910	C 385	Nash, George William.	May 17, 1917	C 565
Malone, John.	May 21, 1914	C 585	Neen, Joseph	Nov. 27, 1909	C 352
Malone, Patrick	Oct. 1, 1907	C 247	Nelson, Horatio.	Oct. 1, 1907	C 263
Maltman, James	Oct. 31, 1912	C 501	Neilson, William	May 9, 1912	C 481
Mansfield, A.	May 1, 1909	C 336	Newman, John	Oct. 14, 1914	C 603
Marrs, John	May 17, 1917	C 640	Nicholson, James	May 9, 1912	C 469
Marsh, Daniel Parks	May 27, 1913	C 543	Nimmo, James	May 9, 1912	C 461
Marsh, John.	Oct. 1, 1907	C 270	Norris, Joshua	Oct. 28, 1913	C 557
Martin, James	June 10, 1911	C 398	Oakes, Robert	Oct. 31, 1912	C 498
Mason, Joseph.	July 22, 1908	C 297	O'Brien, Charles	Nov. 27, 1909	C 349
Massey, Henry	May 1, 1909	C 317	Odgers, Alfred	Jan. 21, 1913	C 529
Mather, Thomas	July 22, 1908	C 293	Odgers, Eli	Jan. 21, 1913	C 523
Matusky, Andrew.	Oct. 1, 1907	C 259	Orr, Alexander	Oct. 28, 1911	C 434
Mawson, J. T	Nov. 27, 1909	C 359	Osborne, Hugh	Oct. 28, 1913	C 555

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Oswald, Geo. L.	Sept. 10, 1910	C 370	Smith, A. E.	Sept. 10, 1910	C 367
Owen, Thomas	May 1, 1909	C 347	Smith, John Watterson	May 16, 1918	C 665
Park, William	Dec. 19, 1918	C 684	Smith, Joseph	Mar. 4, 1905	C 207
Parks, Alexander	Jan. 21, 1913	C 519	Smith, Richard Beveridge	Oct. 28, 1913	C 561
Parker, L.	May 1, 1909	C 341	Smith, Thos. J.	Oct. 1, 1907	C 271
Parkinson, James William	Nov. 15, 1917	C 655	Smith, Thomas	May 9, 1912	C 486
Parkinson, T.	July 22, 1908	C 289	Snow, Aubrey	May 16, 1918	C 675
Parrott, Jas. E.	May 21, 1914	C 590	Sopwith, Reginald Scott	Jan. 21, 1913	C 512
Parson, Herbert	May 13, 1915	C 621	* Sparks, Edward	Oct. 1, 1907	C 255
Pearson, Jonathan	May 9, 1912	C 473	Spencer, G.	May 1, 1909	C 329
Penman, Hugh	Oct. 28, 1913	C 552	Spruston, R. L.	Nov. 27, 1909	C 355
Perry, George Harewood	May 17, 1917	C 643	Spruston, Thomas A.	Mar. 4, 1905	C 206
Phillips, Richard Stephen	May 17, 1917	C 620	Stafford, M.	Sept. 10, 1910	C 382
Pickup, A.	July 22, 1908	C 310	Starr, Wallace	May 9, 1912	C 488
Picton, W.	May 1, 1909	C 333	Staton, Edward	May 21, 1914	C 581
Plank, Samuel	Nov. 14, 1905	C 233	Steele, Walter	Oct. 28, 1911	C 439
Poole, Samuel	May 27, 1913	C 536	Stewart, George	May 27, 1913	C 534
Price, Walter	Sept. 10, 1910	C 371	Stewart, James M.	Oct. 23, 1906	C 240
Puckey, John Thomas	Dec. 19, 1918	C 687	Stockwell, William	Oct. 23, 1906	C 238
Quinn, James	Oct. 28, 1911	C 441	Strachan, John	Oct. 14, 1914	C 604
Quinn, John	Oct. 28, 1911	C 429	Strang, James	May 13, 1915	C 614
Radford, Albert	May 21, 1914	C 579	Strang, Thomas	June 10, 1911	C 400
Rallison, R.	July 22, 1908	C 279	Strang, Wm.	June 10, 1911	C 395
Rankin, George	July 22, 1908	C 275	Sutherland, John	May 27, 1913	C 545
Rankin, Wm. Shaw	May 9, 1912	C 489	Taylor, Charles M.	Mar. 4, 1905	C 213
Ratcliffe, Thomas	Oct. 1, 1907	C 253	Taylor, Hugh	Jan. 21, 1913	C 530
Raynor, Fred	Oct. 1, 1907	C 257	Taylor, James	May 21, 1914	C 567
Reid, Robert	Sept. 10, 1910	C 383	Taylor, Jonathan	Dec. 19, 1918	C 680
Reid, Thos.	May 21, 1914	C 592	Taylor, J. T.	Oct. 28, 1911	C 447
Reid, Wm.	June 10, 1911	C 403	Taylor, Leroy	Sept. 10, 1910	C 381
Reilly, Thomas	July 22, 1908	C 303	Taylor, Thomas	May 21, 1914	C 577
Renney, Jas.	Nov. 27, 1909	C 354	Thacker, Geo.	May 27, 1913	C 537
Richards, James	Nov. 1, 1907	C 249	Thomas, Thomas	Sept. 10, 1910	C 365
Richards, Samuel	Oct. 23, 1906	C 244	Thomas, John B.	Nov. 14, 1905	C 231
Richardson, J. H.	Oct. 28, 1911	C 458	Thomas, Joseph	Mar. 4, 1905	C 220
Rigby, John	July 29, 1905	C 225	Thomas, Warriett	Oct. 1, 1907	C 273
Roberts, Ebenezer	May 1, 1909	C 327	Thomason, Charles	Nov. 15, 1917	C 657
Robinson, Michael	May 1, 1909	C 332	Thompson, Thomas	Oct. 1, 1917	C 267
Robson, Thomas	May 21, 1914	C 566	Thompson, John	Oct. 31, 1912	C 509
Rogers, Ellis	May 13, 1915	C 624	Thompson, Joseph	Oct. 1, 1907	C 269
Roper, William	July 22, 1908	C 274	Thomson, Duncan	Mar. 4, 1905	C 218
Rowan, Alexander	Oct. 31, 1912	C 500	Tolley, John	Dec. 19, 1918	C 678
Rowan, John	Oct. 14, 1914	C 602	Touhey, William	May 27, 1913	C 547
Rowbottom, Thomas	Oct. 31, 1914	C 492	Tully, Thomas	May 9, 1912	C 468
Royle, Edward	Oct. 31, 1912	C 506	Tune, Elijah	May 9, 1912	C 476
Russell, Robert	Nov. 27, 1909	C 351	Turnbull, Matthew	Oct. 14, 1914	C 598
Rutherford, Jasper	May 17, 1917	C 644	Vardy, Robt.	May 21, 1914	C 570
Rutledge, Edwin	July 22, 1908	C 302	Vaughan, John Henry	Oct. 28, 1913	C 560
Scott, Henry	July 22, 1908	C 294	Walker, George	July 8, 1916	C 633
Saunders, Eustace L.	Jan. 21, 1913	C 520	Walker, Jas. Alexander	Oct. 31, 1912	C 496
Scarpino, Francis	May 17, 1917	C 649	Walker, Wm.	May 21, 1914	C 586
Seddon, James	Oct. 3, 1919	C 692	Wallace, Fred	Oct. 1, 1907	C 260
Shanks, David	Sept. 10, 1910	C 372	Warburton, Ernest Leonard	June 10, 1911	C 399
Sharp, James	May 1, 1909	C 325	Ward, Ernest Hedley	May 17, 1917	C 641
Sharples, J. T.	Sept. 10, 1910	C 380	Wardrop, James	Oct. 31, 1912	C 504
Shearer, L.	May 1, 1909	C 330	Watson, Adam G.	Mar. 4, 1905	C 212
Shields, Thomas	May 16, 1918	C 667	Watson, Arthur W.	May 27, 1913	C 535
Shipley, John W.	Oct. 28, 1911	C 456	Watson, George	July 22, 1908	C 288
Shooter, Joseph	Oct. 1, 1907	C 261	Watson, Joseph	Jan. 21, 1913	C 515
Shortman, J.	May 1, 1909	C 331	Watson, William	Oct. 22, 1906	C 246
Simister, J. H.	Nov. 27, 1909	C 353	Watson, William	May 17, 1917	C 645
Simister, W.	May 1, 1909	C 334	Webb, Herbert	Oct. 28, 1911	C 457
Simms, Hubert Allan	Jan. 21, 1913	C 526	Webster, James Stewart	Dec. 19, 1918	C 685
Sinclair, William	Jan. 21, 1913	C 527	Weeks, John	Mar. 4, 1905	C 214
Skelton, Thos	May 1, 1909	C 344	West, James Gloag	May 16, 1918	C 676

* C 314 issued in lieu of C 255 destroyed by Fernie fire.

THIRD-CLASS CERTIFICATES ISSUED UNDER "COAL MINES REGULATION ACT FURTHER AMENDMENT ACT, 1904"—*Continued.*

NAME.	DATE.	Cer. No.	NAME.	DATE.	Cer. No.
Whalley, William	Dec. 19, 1918	C 686	Wilson, William	May 17, 1917	C 647
White James	Oct. 31, 1912	C 499	Winstanley, H.	July 22, 1908	C 283
White, John	Oct. 22, 1906	C 245	Wintle, Thomas A	July 29, 1905	C 222
Whitehouse, Wm.	June 10, 1911	C 402	Witherington, George	Oct. 28, 1913	C 554
Wilkinson, Edward	Oct. 28, 1911	C 438	Wood, Thos. James	Oct. 31, 1912	C 491
Williams, John Sam.	June 10, 1911	C 404	Worthington, J.	July 22, 1908	C 295
Williams, Watkin	June 22, 1908	C 301	Wright, John	May 21, 1914	C 593
Wilson, Robinson	June 10, 1911	C 397	Wright, Robert	May 21, 1914	C 589
Wilson, Thomas M.	Oct. 1, 1907	C 272	Wright, William	Jan. 21, 1913	C 522
Wilson, William	Oct. 1, 1907	C 262	Young, Alexander	May 16, 1918	C 666

COAL-MINE OFFICIALS.

Third-class Certificates issued under "Coal Mines Regulation Act Further Amendment Act, 1904," sec. 38, subsec. (2), in exchange for Certificates issued under the "Coal Mines Regulation Act Amendment Act, 1901."

Name.	Date.	Certificate No.	Name.	Date.	Certificate No.
Adam, Robert	Oct. 12, 1904	C 42	Lewis, Thos	Oct. 11, 1904	C 35
Addison, Thos	Dec. 10, 1904	C 52	Malpass, James	Nov. 7, 1904	C 113
Aitken, James	Oct. 24, 1904	C 44	Marsden, John	May 3, 1904	C 21
Allsop, Harry	Oct. 11, 1904	C 34	Miard, Harry E	March 3, 1905	C 76
Ashman, Jabez	Feb. 5, 1907	C 131	Middleton, Robt	Feb. 11, 1905	C 71
Auchinvole, Alex	March 29, 1905	C 89	Miller, Thos. K	Feb. 21, 1905	C 74
Barclay, Andrew	April 27, 1904	C 19	McKenzie, John R	Oct. 12, 1904	C 40
Barclay, James	April 27, 1904	C 20	McKinnon, Arch'd	April 3, 1905	C 102
Barclay, John	April 17, 1905	C 111	McMillan, Peter	March 29, 1905	C 94
Bickle, Thos	Oct. 11, 1904	C 37	McMurtrie, John	March 29, 1905	C 96
Bowie, James	May 13, 1905	C 116	Moore, Wm. H	June 17, 1905	C 119
Briscoe, Edward	Oct. 10, 1906	C 129	Morris, John	Dec. 27, 1904	C 57
Campbell, Dan	March 29, 1905	C 93	Myles, Walter	April 3, 1905	C 100
Carr, Jos. E	Oct. 11, 1904	C 36	Nash, Isaac	June 1, 1904	C 120
Carroll, Harry	March 29, 1905	C 98	Neave, Wm	Oct. 12, 1904	C 43
Clarkson, Alexander	April 27, 1904	C 18	Nelson, James	April 27, 1904	C 16
Collishaw, John	Feb. 7, 1905	C 68	Newton, John	Oct. 12, 1904	C 39
Comb, John	March 23, 1904	C 2	Nimmo, Jas. P	April 3, 1905	C 103
Cosier, Wm	March 29, 1905	C 86	Nimmo, Richard E	April 18, 1911	C 133
Courtney, A. W	Nov. 2, 1904	C 45	O'Brien, Geo	Feb. 6, 1905	C 66
Crawford, Frank	April 6, 1904	C 7	Pearse, Thomas W. H	April 14, 1916	C 138
Daniels, David	April 27, 1904	C 12	Perrie, James	March 15, 1905	C 81
Davidson, David	April 3, 1905	C 106	Price, Jas	Nov. 8, 1904	C 50
Davidson, John	March 29, 1905	C 87	Rafter, Wm	March 29, 1905	C 95
Devlin, Henry	Oct. 12, 1904	C 41	Reid, James	March 23, 1904	C 1
Dobbie, John	Nov. 27, 1905	C 126	Richards, Thos	April 27, 1904	C 14
Dudley, James	March 22, 1905	C 114	Ross, John	April 3, 1905	C 101
Duncan, Thomas	Aug. 29, 1906	C 128	Roughead, George	Jan. 30, 1907	C 130
Dunlap, Henry	Nov. 21, 1904	C 51	Ryan, John	Dec. 28, 1904	C 59
Dunn, Geo	Dec. 19, 1904	C 56	Sanders, John W	April 3, 1905	C 107
Dunsmuir, John	March 29, 1905	C 90	Shenton, Thos. J	July 25, 1904	C 30
Eccleston, Wm	March 15, 1905	C 80	Shepherd, Henry	June 13, 1904	C 26
Fagan, David	April 6, 1905	C 109	Smith, Geo	March 29, 1905	C 84
Farquharson, John	April 27, 1904	C 17	Somerville, Alex	March 24, 1904	C 3
Findlayson, James	June 6, 1904	C 25	Stauss, Chas. F	Feb. 9, 1905	C 69
Fulton, Hugh T	April 3, 1905	C 105	Steele, Jas	March 29, 1905	C 92
Gibson, Edward	May 30, 1905	C 118	Steele, John	June 4, 1913	C 4
Gilchrist, Wm	March 29, 1905	C 85	Stewart, Duncan H	March 28, 1904	C 137
Gillespie, Hugh	April 6, 1904	C 8	Stewart, John	April 3, 1904	C 104
Gillespie, John	April 6, 1904	C 5	Stewart, Daniel W	May 16, 1904	C 23
Gould, Alfred	April 17, 1906	C 112	Stoddart, Jacob	Feb. 21, 1905	C 73
Green, Francis	Oct. 11, 1904	C 38	Strachan, Robt	April 27, 1904	C 15
Handlen, Jas	June 16, 1904	C 122	Strang, James	April 27, 1904	C 10
Harmison, Wm	Feb. 3, 1905	C 65	Sullivan, John	July 4, 1916	C 139
Hescott, John	Jan. 16, 1905	C 62	Thomas, John	March 29, 1905	C 97
Hoggan, Wm	June 6, 1911	C 134	Vass, Robt	Dec. 12, 1904	C 53
John, David	Nov. 8, 1904	C 49	Vater, Charles	April 6, 1904	C 66
John, Evan	July 25, 1916	C 140*	Webber, Chas	Sept. 13, 1904	C 32
Johnson, Geo	May 9, 1904	C 124	Webber, Charles F	Sept. 13, 1904	C 33
Johnson, Wm. R	March 1, 1905	C 75	Whiting, Geo	May 29, 1905	C 117
Jones, Evan	April 30, 1913	C 136	Wilson, Austin	Feb. 7, 1905	C 67
Kerr, Wm	March 29, 1905	C 91	Wilson, Thos	April 27, 1904	C 11
Lander, Frank	Jan. 9, 1905	C 61	Woodburn, Moses	March 29, 1905	C 83
Lanfear, Herbert	Jan. 27, 1905	C 63	Yarrow, Geo	Nov. 3, 1904	C 46

* Issued in lieu of No. C 132, lost.

INSPECTION OF METALLIFEROUS MINES.

WEST KOOTENAY AND BOUNDARY DISTRICTS.

REPORT BY JAMES MCGREGOR, INSPECTOR.

I have the honour to submit my annual report as Inspector of Metalliferous Mines for West Kootenay and Boundary Districts for the year 1919.

NELSON DISTRICT.

There has been more activity in mining in this district than last year, consisting principally of development-work; especially is this the case in the Sheep Creek section, where there are two long crosscut tunnels now being driven—one at the *Queen* mines property and one at the *Nugget* mines property; they are still being pushed forward, not having reached their objective as yet. A great interest is taken in these crosscut tunnels by those interested in mining in this district, and the result of any discoveries made is eagerly looked for.

Contiguous to the city of Nelson there has been considerable increase in development of both old and new properties; the amount of production has increased during the year, with every indication of greater production in the near future. At all times when these mines were inspected they were found in a safe and sanitary condition.

LARDEAU DISTRICT.

Mining conditions in this district remain about the same as last year, consisting of further development of the older properties and prospecting in new sections, with a fair outlook for the future.

BOUNDARY DISTRICT.

Mining in this district has not been so active as in the past year. The Granby mines, the largest producer in the district, ceased producing temporarily on June 14th, and I have no knowledge when operations will be resumed. Upon the many inspections made during the year of these large mines the travelling-ways, haulage-ways, shafts, and hoists were at all times kept in good condition. The sleeping and eating rooms were clean and sanitary. The same careful system of handling and transporting of explosives was carried out.

SLOCAN DISTRICT.

Although mining was active in this district during last year, the activity has increased considerably during this year. The number of smaller mines being operated under lease has increased, the older and producing mines have greatly extended their workings by systematic development, and in nearly all cases have increased their output, with the exception of the *Standard* mine, situated near Silverton, which has about ceased shipping entirely, devoting all attention to developing the present mine and systematically prospecting other sections of the property.

The scarcity of water for milling purposes when the cold weather freezes the streams has been a drawback in this district as in former years, which has quite an effect on production. The scarcity of efficient labour has also been a retarding factor throughout this district.

From my own inspection of the mines in this district and from the reports of H. H. Johnstone, Inspector of Mines, who inspected most of the mines of the district, we have found care has been exercised at all times in complying with the requirements of the "Metalliferous Mines Inspection Act."

TRAIL DISTRICT.

The principal mines of this district are located at Rossland. While they have not produced to their full capacity, the production has been much greater than last year. A large force has been steadily engaged in developing known areas and prospecting new ones. These mines are the deepest in the Province and are well ventilated, the travelling-ways are kept clean and safe, as are the skips, safety-catches, guides, and hoisting-ropes. The timber, which is used in plenty in these mines, is, as usual, framed by machinery and carefully placed. The sanitary conditions in and around the mines are good.

YALE DISTRICT.

There has been no increase in the number of producing metalliferous mines in this district during the year, but those producing have operated continuously during the year, and much has been accomplished in the several mines of this district by development, which has been persistently and systematically carried on by diamond-drilling and drifting. The *Copper Mountain* mine, the largest in the district and located on Copper mountain, in the Princeton section, has not commenced active production owing to lack of transportation facilities. This mine bids fair to be one of the largest producers in the Province in the near future; the mine is well developed and equipped with the most modern appliances for sustaining a large output for many years, Upon inspection of this mine I have found it well ventilated, safe, and sanitary; the same conditions exist in the bunk-houses and eating-rooms.

Enclosed is a list of accidents reported to the office which occurred in and around the metalliferous mines of these districts during the year 1919.

EAST KOOTENAY AND NICOLA INSPECTION DISTRICTS.

REPORT BY ROBERT STRACHAN, INSPECTOR.

I have the honour to submit the annual report as Inspector of Metalliferous Mines for the above districts during the year ending December 31st, 1919.

The mines operating in the East Kootenay District during that period were the *Sullivan* at Kimberley and the *St. Eugene* at Moyie, both owned by the Consolidated Mining and Smelting Company of Canada, and the *Paradise*, in the Windermere district, owned by R. R. Bruce.

In the Nicola District the only mine operating during the entire year was the *Iron Mask*, owned by the Kamloops Copper Company, of Kamloops, and very little work was carried out at either the Highland Valley, Aberdeen, or Stump Lakes mines.

Sullivan.

E. Montgomery, superintendent. This mine, which is situated about twenty miles from Cranbrook and is reached by a branch of the Canadian Pacific Railway, worked fairly steadily in the earlier part of the year, but owing to labour troubles the output of ore was very much reduced toward the latter end. The ore mined contains silver, lead, and zinc, and during the past few years iron pyrites have also been shipped to the smelter at Trail. The upper portion of the mine is mostly stoping, while in the lower portion, or new tunnel district, practically all development. This tunnel, now driven in for a distance of almost 8,000 feet, has reached its objective—namely, the ore-body—and is connected to the upper working by a drill-hole. A shaft has been started to connect the two workings, but due to the labour trouble has not been finished.

During my inspections I have always found the conditions very good, and, so far as I could observe, the "Metalliferous Mines Inspection Act" very well complied with. The upper workings are ventilated by natural ventilation, while a small blower-fan provides a plentiful supply for the tunnel district. Samples of the mine-air taken and analysed at Ottawa show no signs of carbon monoxide or other noxious gases.

One fatal accident, the only accident reported during the year, occurred in the upper working of this mine owing to an ore-chute built through the ore-pile giving way, allowing the lower portion of the loose rock to run into the chute unknown, and when the surface caved one of the workmen was drawn into the slide. The unfortunate workman was caught on the edge of the chute, and to prevent him being carried into the chute it was found necessary to secure him by ropes.

Iron Mask Mine and Concentrator, Kamloops.

Middlesboro Colliery, Nicola M.D.

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The work of rescue was carried out under very dangerous conditions, requiring the removal of almost 500 tons of ore and the bracing of thousands of tons before the man was reached. This work occupied almost twenty hours, during which everything that was possible to do to render his condition more comfortable was done, but unfortunately he succumbed a few minutes before reached. The work of the miners and officials in the face of very difficult and dangerous conditions was worthy of the greatest praise, no efforts being spared to rescue the unfortunate man.

The mine is generally very well timbered and attention is paid to bar down all the loose rocks before setting up the machines. The explosives used are the different percentages of Polar Ammonia Dynamite, and this is kept in a well-protected magazine, only sufficient being taken out for the day's requirements, and no open lights are allowed near the powder-house, this being fitted with electric light.

The main levels and hoist-rooms are lighted with electric lights and the miners use carbide-lamps. The mine is regularly inspected by a committee appointed by the workmen and any defects reported are immediately attended to.

The ore from the inside workings is taken by electric locomotive to the bunkers, where the inferior grade is picked out, and in the case of the upper workings the rest is conveyed by aerial tramway to the ore-pockets at the railway-track, to which also the ore from the lower tunnel is taken direct. From the ore-pockets it is shipped in railway-cars to Trail smelter for treatment.

St. Eugene. Situated at Moyie. John Taylor, superintendent. The work here, as mentioned in last year's report, consists of recovering small bodies of ore which could not have been very profitably mined on a larger scale. The ore mined is silver and lead, and all the work is done with hand-steel, the ore being sorted and sacked in the mine; then trammed to the outside, from where it is hauled to the railway-siding at Moyie and shipped to Trail smelter. Only a few men are employed and I have generally found the conditions very good, both with respect to ventilation and timbering.

Paradise. Robert McDonald, superintendent. This mine is situated about twenty miles from Invermere, at an elevation of 7,600 feet, and is reached by a fairly good wagon-road, which is used for transporting the ore to the railway-siding at Invermere. The ore mined carries fairly high values in silver and lead, and about forty men have been employed very steady during the year. The method of mining is shrinkage stoping, and, as there is no attempt made to concentrate, only the richer portion of the ore-body is taken out. This is taken to the outside in trams by pushers, and in the case of the No. 4 level these are run down to the ore-pockets by a surface tram; from the No. 2 level an aerial tramway brings the ore down to the pockets.

At the time of my inspection I found the conditions to be very good, both with respect to ventilation and timbering, and owing to the soft nature of the ore the ground has to be piled ahead. A sample of the mine-air showed it to be fairly good and free from noxious gases. The explosive used is Polar Ammonia Dynamite, which is kept in a safe magazine and only sufficient taken out for the day's work. Cook-house, bunk-house, office, and other buildings are maintained at the mine, while a half-way house is maintained at Jackpine for the use of the teamsters. In the early and late parts of the winter it is frequently found necessary to change from wheels to sleigh, and this is done at Jackpine.

Iron Mask. A. Wallinder, superintendent. This property is situated about seven miles south-east of the city of Kamloops and consists of the *Iron Mask* and *Erin* claims. These two are connected and all the ore mined is hoisted through the *Iron Mask*. The ore is a copper sulphide and carbonates and is worked on a shrinkage-pillar method; it is hauled to the ore-pockets by horse-haulage, then hoisted to the surface and taken to the concentrator by belt-conveyor.

The shaft is 780 feet deep, using a skip on guides, a 125-horse-power hoist being used for hoisting with a 1-inch steel cable. The mine is timbered with square sets and stulls as required, and I have always found it very well timbered and every precaution taken to ensure safety for the workmen. There is a good current of air circulating and the mine is kept in good sanitary condition. There were twenty-one men employed underground at the time of my inspection and they seem very capable and well supervised.

Two compressors with a joint capacity of 1,100 cubic feet of free air a minute supply power for the drills, and the pumps are driven by electric power. All the machinery around the mine

is driven by electric power, which is supplied from the hydro-electric plant of the city of Kamloops, being brought over wires to the mine at a voltage of 11,000 and reduced to 440 for power purposes. The oil-flotation system of concentration is used, the concentrates being hauled by teams to the railway-siding at Cherry Creek, on the main line of the Canadian Pacific Railway.

Great trouble is experienced in getting a suitable supply of water, especially for domestic purposes, and this has also to be brought by teams from Cherry Creek, but it is expected in the near future to install a pump on the Thompson river and pump to a reservoir at the mine. Attached is a list containing the only accident reported during the year.

COAST INSPECTION DISTRICT.

REPORT BY JOHN NEWTON, INSPECTOR.

I have the honour to submit my annual report of the metalliferous mines in my inspectorate for the year ending December 31st, 1919.

Britannia.

The mines were inspected by Mr. Newton up to December, 1919, when he was taken ill on an inspection trip to Britannia, Howe sound. In the *Fairview* mine, the operation was carried on as in former years—namely, the extension of mine drifts for stoping operations on veins previously opened. Mining at the upper glory-holes above the 250-foot level was not carried on as extensively as at the *Bluff* glory-hole, the latter being worked on a large scale for approximately nine months of the year, being forced to discontinue it on account of unfavourable weather conditions.

The 1,600-foot level was driven to connection through Britannia mountain during the year, this being the fifth tunnel to pierce the mountain, having portals on both the north and south side. On the south side, at the mouth of the 500-, 1,000-, and 1,600-foot levels, bunk-houses have been erected during previous years for the accommodation of employees working in those sections of the mine.

The Victoria tunnel (8 x 8 feet), to the east of the *Empress* workings, at an elevation corresponding to the 1,800-foot level, advanced during the year to a total of 485 feet, from which point they are carrying on extensive diamond-drill prospecting. The Hillside tunnel (8 x 8 feet), to the west of the *Jane* mine, on the 1,000-foot level, was advanced to a total of 480 feet. The raise which is being driven on a 65-degree slope, with dimensions 7 x 12 feet, for transportation purposes between the 4,100-foot level and the 3,100-foot level tunnels, and which was commenced in the previous year, was driven for a short period only and advanced to a total of 120 feet. The 3,100-foot level, east drift, advanced 113 feet, work on it continuing but a short time.

In addition to the foregoing and exclusive of the work on the 1,800-foot level, above mentioned, the diamond-drill footage for the year amounted to 3,922 feet, being distributed between the *Bluff*, *Jane*, and *Empress* sections of the mine.

Eight hopper-bottom cars, 3-foot gauge, 20-ton capacity, and two 3-foot gauge, 20-ton, all-steel flat cars were added to the outside ore-haulage equipment for the transportation of ore between the rock-raise and the tramway and incline ore-bins.

The welfare of the Beach community was further considered during the year by the erection of a building 64 feet long by 36 feet wide, two stories high. The ground floor is occupied by barber-shop, billiard and pool hall, and reading-room; while the upper floor is fitted up as a dance-hall, which is much in requisition during the winter months. The building is heated by steam and provided with Brasco lights throughout.

On account of upset market conditions resulting in a very low price for copper, it was necessary to carry the operation on a reduced basis throughout practically the whole of the year, with the result that the programme in connection with transportation tunnels and raises and other construction-work was greatly curtailed. This operation was reported well ventilated and in safe condition.

Marble Bay.

This mine is situated on Texada island and is operated by the Tacoma Steel Company. The officials are: E. F. Eastman, managing director; D. C. Stevens, general superintendent. The mechanical equipment is the same as reported in 1918. This mine has now reached a vertical depth of 1,600 feet below the collar of the shaft. A considerable proportion of the tonnage was mined from the 1,600-foot level and some development and drilling was carried on in the 1,700 level, which is 225 feet below the 1,600-foot level on a pitch of 45 degrees. This mine was well ventilated and in good and safe condition.

NORTHERN INSPECTION DISTRICT.

EXTRACTS FROM REPORT OF T. J. SHENTON, INSPECTOR.

The *Engineer* mine on east side of Taku arm is the only metalliferous mine being worked in the Atlin Division. "Ample provision has been made to meet requirements so far as safety, ventilation, and sanitation are concerned."

Premier.—Portland Canal Mining Division. "I found all conditions, both in and about the mine, to be in harmony with the 'Metalliferous Mines Inspection Act.'"

Swamp Point.—Portland Canal Mining Division. Operated by Granby Company. "The prevailing conditions at this mine are in accord with the 'Metalliferous Mines Inspection Act.'"

Anyox Mines.—Owned by Granby Company. "The prevailing conditions in connection with the whole of the works in the mine and on the surface have been in full compliance with the 'Metalliferous Mines Inspection Act.'"

Quartz Point.—Owned by Granby Company. "The prevailing conditions of ventilation, timbering, and other matters pertaining to the safety of those employed has been in satisfactory compliance with the law."

First-aid and Safety-first Work of Granby Co.—"There is no part of the work more carefully attempted on the part of the Granby management which is more gratifying to me than that relating to the endeavour being made in first-aid and safety-first work."

Missouri and Joker.—"The general conditions of timbering, ventilation, etc., were well within the stipulations of the 'Metalliferous Mines Inspection Act.'"

Dolly Varden.—Nass Mining Division. "In all my inspections of this mine I am able to say that the operations, and consequently prevailing conditions, were in keeping with the requirements of the 'Metalliferous Mines Inspection Act.'"

Grouse Mountain.—Omineca Mining Division, twenty miles from Telkwa. "I have inspected this property a number of times during the present year and I have found the company always willing to co-operate with me in the carrying-out of the recommendations of the law."

Silver Standard.—"In all my visits of inspection to this mine I have found the general conditions in strict accord with the 'Metalliferous Mines Inspection Act.'"

Surf Inlet.—Princess Royal island. "In my inspections of the mine I have always found a willingness on the part of the management to co-operate in carrying out the 'Metalliferous Mines Inspection Act.' The general conditions of the entire operations are fully in accord with the Act."

Ikeda.—Queen Charlotte Islands. "In my inspection of the mine I found the general conditions to be in fair keeping with the 'Metalliferous Mines Inspection Act.'"

LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1919.

COAST DISTRICT.

REPORT BY T. J. SHENTON AND JOHN NEWTON, INSPECTORS.

No.	Mine.	Date.	Name.	Occupation.	Details.
1	Surf Inlet	Jan. 3	G. C. Adams	Mucker	Wound on scalp, shoulder, arm, and hand, left side; rock fell off hanging-wall and struck him.
2	"	" 4	P. Jonikatis	Machine and bar man	Piece of rock fell on right wrist, inflicting wound 1½ inches long.
3	"	" 25	Thos. Koleff	Machineman	Small rock rolled down manway, hitting him on left foot, causing severe bruise.
4	"	Feb. 21	Cecil A. Brett	Asst. to Mine Engineer	Bruises on right side of neck, severe laceration of scalp over right temple, caused by being struck by piece of drill-steel while passing steel chute.
5	"	March 6	A. L. Donahue	Timberman	Fatally injured by being caught between skip and timbers in shaft.
6	"	April 7	A. Mikuliki	Mucker	Wound on right ear, caused by bar slipping and hitting him.
7	Britannia	June 7	Val. Dapoto	Miner	Fell into glory-hole and was crushed to death.
8	Hidden Creek	" 25	Nat Condo	Barman	Fell down stope, receiving fatal injuries.
9	Britannia	July 14	Oscar Granberg	Miner	Fell through grizzly, dropping 170 feet, and was killed.
10	"	Dec. 10	Dan Gillis	"	Fatally injured through being struck by material when compressed-air pipe broke at mine portal (surface).
11	Hidden Creek	" 16	D. McLeod	Chuteman	Dislocated right hip, bruised right side, caused by being hit with rock in chute, which he had entered in violation of order forbidding same.

KOOTENAY-SIMILKAMEEN DISTRICT.

REPORT BY JAMES MCGREGOR, H. H. JOHNSTONE, AND ROBERT STRACHAN, INSPECTORS.

12	Granby, Phoenix	Mar. 19	G. T. Mattock	Motorman	Broken bone of right leg, caused by rock rolling over chute-gate and striking him.
13	" "	April 13	H. Christensen	Mucker-boss	Bruised shoulders and broken leg, caused by being hit with rock rolling down chute.
14	Horne Silver, Similkameen	" 24	James Fuller	Blacksmith	Cut on top of head, caused by small rock rolling down mountain-side and striking him while in a stooping position (surface).
15	Copper Mountain, Similkameen	May 3	Alex. Corsi	Barman	Fracture of two ribs on left side and small puncture of left lung, bruises on body and cuts on face and head, caused by falling rock knocking out staging in shaft, dropping him 20 ft.
16	Sullivan, Kimberley	June 9	Henry Hogberg	Miner	Fatally injured by being dragged into chute and buried with rock.
17	Rosebery Surprise	July 6	Wm. Eccles	Mucker	Radius of right arm broken half-way between hand and elbow, wound in hand, and other minor bruises, caused by fall of rock.
18	Sally, Greenwood	" 16	John Ryan	Miner	Strained muscles in right knee, caused by falling clay.
19	Bluebell, Riondel	" 18	Fred. Watts	Carman	Right foot bruised by falling from loading-platform to deck of barge.
20	Wonderful, Sandon	" 27	Ernest Larson	Miner	Damage to hip and internal injuries, caused by fall of rock from foot-wall.
21	Bell, Beaverdell	Nov. 15	T. Sullivan	"	Bruised leg caused by fall of rock.

TABULATED LIST OF ACCIDENTS IN METALLIFEROUS MINES, 1919.

	Cause of Accident.	Extent of Injury.			
		Fatal.	Serious.	Slight.	Total.
A	Blasting	..	..	..	..
B	Defective powder	..	..	..	..
C	Drilling	..	..	..	..
D	Powder in muck	..	..	..	..
E	Shafts and cages, accidents connected with	1	..	..	1
F	Falling down shafts, stopes, or winzes	1	..	..	1
G	Falling down chutes	3	..	1	4
H	Mine-cars	..	..	..	..
I	Rock falling in stopes, levels, etc	..	..	2	2
J	Rock falling down chutes or openings	..	3	5	8
K	Timbering	..	..	..	..
L	Miscellaneous, underground	..	..	2	2
M	Miscellaneous, surface	1	..	2	3
	Totals	6	3	12	21
	Accidents for each 100,000 tons ore mined	0.280	0.140	0.560	0.98
	Accidents for each 1,000 men employed	1.588	0.794	3.176	5.55

COAL-MINING IN BRITISH COLUMBIA.

By Wm. Fleet Robertson, Provincial Mineralogist.

During the year 1919 there was mined in the various collieries of the Province 2,408,948 tons (2,240 lb.) of coal, a decrease from the preceding year of 169,776 tons, equivalent to about 6.5 per cent.

The output of coke shows a decrease of about 51 per cent. as compared with the previous year.

The following table shows, for the past ten years, the output and the *per capita* production of the various districts:—

Output and Per Capita Production of Various Districts.

Year.	District.	Gross Tons of Coal mined during Year.	Total No. of Employees at Producing Collieries.	Tons of Coal mined per Employee for Year.	Number of Men employed Underground in Producing Collieries.	Tons of Coal mined per Underground Employee for Year.
1910	East Kootenay District	1,365,119	3,111	439	2,374	575
	Coast District	1,774,116	4,647	382	3,529	502
	Whole Province	3,139,235	7,758	404	5,903	532
1911	East Kootenay District	442,057	2,197	201	1,585	272
	Coast District	1,855,661	4,676	397	3,627	511
	Whole Province	2,297,718	6,873	334	5,212	440
1912	East Kootenay District	1,261,212	2,410	523	1,780	708
	Coast District	1,764,497	4,720	374	3,495	504
	Whole Province	3,025,709	7,130	424	5,275	574
1913	East Kootenay District	1,331,725	2,666	500	1,965	678
	Coast District	1,239,035	3,777	328	2,865	433
	Whole Province	2,570,760	6,443	399	4,830	532
1914	East Kootenay District	955,183	2,397	399	1,749	547
	Coast District	1,211,245	3,335	363	2,518	481
	Whole Province	2,166,428	5,732	379	4,267	508
1915	East Kootenay District	852,572	1,748	488	1,183	721
	Coast District	1,120,008	3,230	347	2,512	446
	Whole Province	1,972,580	4,978	396	3,695	534
1916	East Kootenay District	882,270	1,674	527	1,125	784
	Coast District	1,603,310	3,386	474	2,569	624
	Whole Province	2,485,580	5,060	491	3,694	673
1917	East Kootenay District	551,751	1,481	372	944	584
	Coast District	1,846,964	3,689	501	2,816	656
	Whole Province	2,398,715	5,170	463	3,760	638
1918	East Kootenay District	732,864	1,327	552	814	900
	Coast District	1,845,860	4,100	450	2,844	645
	Whole Province	2,578,724	5,427	475	3,658	705
1919	East Kootenay District	558,806	1,369	409	1,000	559
	Coast District	1,850,142	4,597	402	3,145	588
	Whole Province	2,408,948	5,966	404	4,145	581

While no figures can be given as to the actual cost of mining in the different fields, the *per capita* production of these fields is of interest, as having a bearing upon the working costs and as indicating the mining facilities existing and the improvement made in these conditions from year to year.

It will be seen from the foregoing table that the production *per capita* increased more or less regularly up to the year 1912, but that the years 1913, 1914, 1915, and 1919 show a decrease, especially in the Coast District. This decreased effectiveness, during the last few years, of the labour employed is largely due to the extension of the workings of the mines, causing a greater length of haulage and greater extent of old workings to be taken care of, but some of the increased labour is undoubtedly on account of the greater number of men employed in safeguarding the mine and workmen. In the year 1917 it will be observed that while the *per capita* output of the Coast collieries also shows an increase, the Crowsnest District shows a very considerable decrease, which is caused by the fact that a large amount of the underground labour in these collieries is engaged in non-productive work, such as repairing the damage from the former explosion and in opening up a new system of mining which it is expected will tend to greater safety of employees and also of the property.

In 1919 in the Coast District the production *per capita* of men employed underground has decreased from 645 tons to 588 tons, and in the Crowsnest District such production *per capita* has decreased from 900 tons, the highest ever attained in British Columbia, to 559 tons, the lowest it has been in that district since 1914.

The market of the East Kootenay field is provided primarily by the railways of the south-eastern part of the Province and of the northern parts of the adjoining States of Montana and Washington, approximately three-quarters of the coal, sold as such, being exported to those States, while the remainder went to supply the demands of the south-eastern part of the Province—its domestic needs, its railways, steamboats, mines, and smelters. The competition of fuel-oil, frequently referred to in the past, has diminished and promises to practically cease, as supply of oil is scarcely attainable now, and even then only at a price which is not competitive with coal.

Coke, a product of the coal-mines, is sold in the same markets, with the difference that the local consumption—chiefly by the smelters of Trail and the Boundary District—took about 90 per cent. of the product, while 10 per cent. was exported to the States mentioned.

As regards the marketing conditions in this field, the East Kootenay collieries are, however, brought into direct competition with the collieries of Alberta, just over the Provincial boundary-line, all these collieries being in the same coalfield, with practically the same grade of coal and working under similar conditions.

The Coast District may be subdivided into two fields—the Nicola-Princeton field and the Vancouver Island field—in which the markets differ considerably.

The new coalfield on the Telkwa river, in Omineca Division, produced some 1,752 tons of coal which was sold locally. The production of this field has been included in the Coast District.

In the Nicola-Princeton field the consumption is chiefly by the local railways, while a small amount finds its way to Vancouver, even under the handicap of what seems to be an excessively high freight charge.

The Vancouver Island coal market is provided by the domestic and manufacturing requirements of the Coast cities, and of the ocean-going steamers calling at these ports.

The larger coasting steamers and railways, which in later years have all been using California crude oil as fuel, will now be forced to come back to the use of coal, which will mean a largely increased production from Coast collieries.

As in former years, the greater proportion of the coal production was made by three larger companies—the Crow's Nest Pass Coal Company, with two collieries in East Kootenay; and by the Canadian Western Fuel Company, of Nanaimo, and the Canadian Collieries (Dunsmuir), Limited (formerly the Wellington Colliery Company), these last two operating on Vancouver island.

In addition to these large collieries, shipments have been made by the Corbin Coal and Coke Company, in East Kootenay; by the Middlesboro Collieries, Fleming Coal Company (operating Coal Hill Colliery), and Coalmont Collieries, Limited, all of the Nicola Valley; by the Princeton Coal and Land Company, of Princeton; by the Pacific Coast Coal Mines, Limited, British Columbia Coal Mining Company, Limited (formerly Vancouver & Nanaimo Coal Mining Com-

pany), and Nanoose Collieries, Limited, all operating on Vancouver island, near Nanaimo; and by Granby Colliery No. 1 at Cassidy, and Telkwa Collieries Company, of Telkwa.

The details of the shipments made by each of these companies will be found in reports of the Inspectors of the various districts.

During the year 1919 about 60 per cent. of the coal, sold as such by the collieries of the Province, was consumed in British Columbia; and the remainder was exported to the United States, including Alaska. Of the coke sold, about 90 per cent. was consumed in British Columbia, and the remaining 10 per cent. was exported to the United States.

The distribution of this output of coal and coke is shown in the following table:—

COAL AND COKE PRODUCED, EXPORTED, ETC., BY PROVINCE DURING YEAR 1919.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	1,057,404		84,631	
" export to United States	763,990		8,134	
" " other countries				
Total sales		1,821,394		92,765
Lost in washing	252,380			
Used in making coke	141,407			
Used under colliery boilers, etc	210,003		76	
Total for colliery use		603,790		76
		2,425,184		92,841
Stocks on hand first of year	52,924		2,119	
" last of year	76,688		416	
Difference taken from stock during year		16,236		1,703
Output of collieries for year		2,408,948		91,138

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	221		119		340	
Whites—Miners	1,869				1,869	
Miners' helpers	79		2		81	
Labourers	822		574		1,396	
Mechanics and skilled labour	542		546		1,088	
Boys	94		118		212	
Japanese—Miners	60				60	
Helpers	7				7	
Labourers	14		1		15	
Chinese—Miners	92				92	
Helpers	118				118	
Labourers	223		461		684	
Indians—Labourers	4				4	
Totals	4,145		1,821		5,966	

Canadian Collieries—Hydro-electric Power Plant, Comox.

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COLLIERIES OF THE COAST DISTRICT.

The gross output of the Coast District collieries, including the Nicola valley and Telkwa, for the year 1918 was 1,850,142 tons (of 2,240 lb.) of coal actually mined, while some 3,407 tons was taken from "stock," making the actual consumption of coal 1,853,549 tons.

Of this gross consumption, 1,382,119 tons was sold as coal, 163,378 tons was consumed by the producing companies as fuel, and 252,380 tons was lost in washing; while 55,672 tons was used in making coke.

Formerly, in 1902, the Coast collieries exported to the United States 75 per cent. of their coal; in 1910 they exported thereto only 24.5 per cent. of their product, 71.3 per cent. of the output being consumed in Canada. In 1911, 76.1 per cent. of the coal sold was for consumption in Canada, 21.6 per cent. was exported to the United States, and 2.3 per cent. to other countries.

In 1912, 71.25 per cent. was sold for consumption in Canada, 21.25 per cent. exported to the United States, and 7.47 per cent. to other countries.

In 1913, 89.8 per cent. was sold for consumption in Canada, and the balance, or 10.2 per cent., was exported to the United States.

In 1914, 77.3 per cent. was sold for consumption in Canada, and the balance, or 22.7 per cent., was exported to the United States.

In 1915, 67 per cent. was sold for consumption in Canada, and the balance, or 33 per cent., was exported to the United States.

In 1916, 63 per cent. was sold for consumption in Canada, and the balance, or 37 per cent., was exported to the United States.

In 1917, 60 per cent. was sold for consumption in Canada, 37 per cent. exported to the United States, and 3 per cent. to other countries; and in 1918 the proportions were almost the same.

In 1918, 66 per cent. was sold for consumption in Canada, 30 per cent. exported to the United States, and 4 per cent. to other countries.

In 1919, 72 per cent. was sold for consumption in Canada, and the balance, 28 per cent., was exported to the United States.

The following table gives an aggregate summary of the output of the Coast collieries for the year 1919, and shows the disposition made of such product:—

Coal-output from the Coast District for Year 1919.

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	991,477		35,635	
" export to United States	390,642			
" " other countries				
Total sales		1,382,119		35,635
Lost in washing	252,380			
Used in making coke	55,672			
Used under colliery boilers, etc.	163,378		76	
Total for colliery use		471,430		76
		1,853,549		35,711
Stocks on hand first of year	75,978		1,744	
" last of year	72,571		104	
Difference taken from stock during year		3,407		1,640
Output of collieries for year		1,850,142		34,071

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	176		101		277	
Whites—Miners	1,357				1,357	
Miners' helpers	72		2		74	
Labourers	647		384		1,031	
Mechanics and skilled labour	292		403		695	
Boys	83		100		183	
Japanese—Miners	60				60	
Helpers	7				7	
Labourers	14		1		15	
Chinese—Miners	92				92	
Helpers	118				118	
Labourers	223		461		684	
Indians—Labourers	4				4	
Totals	3,145		1,452		4,597	

The following tables show the output of coal and the disposition made of it in the subdivisions of the Coast District:—

COAL-OUTPUT, ETC., 1919, VANCOUVER ISLAND SUB-DISTRICT.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	858,001		35,635	
" export to United States	385,927			
" other countries				
Total sales		1,243,928		35,635
Lost in washing	251,239			
Used in making coke	55,672			
" under colliery boilers, etc.	151,736		76	
Total for colliery use		458,647		76
		1,702,575		35,711
Stocks on hand first of year	74,597		1,744	
" last of year	71,370		104	
Difference taken from stock during year		3,227		1,640
Output of collieries for year		1,699,348		34,071

COAL-OUTPUT, ETC., 1919, NICOLA-PRINCETON SUB-DISTRICT.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	131,724			
" export to United States	4,715			
Total sales		136,439		
Lost in washing	1,141			
Used in making coke				
" under colliery boilers, etc	11,642			
Total for colliery use		12,783		
		149,222		
Stocks on hand first of year	1,381			
" last of year	1,201			
Difference added to stock during year		180		
Output of collieries for year		149,042		

COLLIERIES OF THE EAST KOOTENAY DISTRICT.

The gross output of the collieries of the East Kootenay District for the year 1919 was 558,806 tons (2,240 lb.) of coal actually mined, while 12,829 tons was taken from stock, making the actual consumption of coal 571,635 tons. Of this gross consumption of coal, 439,275 tons was sold as coal, 46,625 tons was consumed as fuel by the producing companies, while 85,735 tons was converted into coke, producing 57,067 tons of coke, while 1,640 tons was taken from stock and 76 tons used as fuel by the producing companies, making the coke sales for the year 57,130 tons.

The East Kootenay collieries exported to the United States about 85 per cent. of the coal sold and about 15 per cent. of the coke.

The following table gives an aggregate summary of the output of the East Kootenay collieries for the year 1919 and shows the dispositions made of such product:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	65,927		48,996	
" export to United States	373,348		8,134	
" " other countries				
Total sales		439,275		57,130
Used in making coke	85,735			
" under colliery boilers, etc	46,625			
Total for colliery use		132,360		
		571,635		
Stocks on hand first of year	16,946		375	
" last of year	4,117		312	
Difference taken from stock during year		12,829		63
Output of collieries for year		558,806		57,067

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	45		18		63	
Whites—Miners	512				512	
Miners' helpers	7				7	
Labourers	175		190		365	
Mechanics and skilled labour	250		143		393	
Boys	11		18		29	
Japanese						
Chinese						
Indians						
Totals	1,000		369		1,369	

INSPECTION OF COAL-MINES, 1919.

The coal-producing areas of the Province are divided into the Coast District, which includes the Vancouver Island and the Nicola-Princeton coalfields, and the East Kootenay District.

COAST DISTRICT.

This district, comprising, as it does, the coalfields of Vancouver island and the Coast, as well as those of the Nicola and Similkameen valleys, has been subdivided, for inspection purposes, into three Inspection Districts.

Two of these Inspection Districts are on Vancouver island, with headquarters for both at Nanaimo, which permits of one of the Inspectors being constantly at headquarters while the other is making inspections; it also permits of the interchanging of inspection duties, so that each Inspector knows both districts.

The third district is the Nicola-Princeton Inspection District, with headquarters at Merritt. During 1918 there was no Inspector for this district, but from January to May inspections were made by John Newton from the Nanaimo office; while from May to the end of the year the inspections were made by either Robert Strachan or Wm. Lancaster, Inspectors from the Fernie office.

NANAIMO INSPECTION DISTRICT.

James Dickson, Inspector (Office, Nanaimo).

The collieries operating and producing coal during the year in this Inspection District, including the new mines that have been started, were:—

Nanaimo: The Canadian Western Fuel Company—No. 1 shaft, Protection shaft, Reserve Colliery, Harewood mine, and two new shafts, called the Wakesiah shafts, which did not produce coal in 1918.

Pacific Coast Coal Mines, Limited—The Morden mine.

British Columbia Coal Mining Company, Limited—New East Wellington Colliery, Mountain District, Nanaimo, No. 1 slope.

Nanoose Collieries, Limited—No. 1 mine.

COMOX INSPECTION DISTRICT.

Henry Devlin, Inspector (Office, Nanaimo).

The collieries operating and producing coal during the year in this Inspection District, including the new mines that have been started, were:—

Extension: The Canadian Collieries (Dunsmuir), Limited—Nos. 1, 2, and 3 mines, all worked from what is known as the No. 1 tunnel, and No. 5 mine at South Wellington.

Cumberland: The Canadian Collieries (Dunsmuir), Limited—Nos. 4 and 7 slopes and No. 5 shaft.

Granby Colliery No. 1 at Cassidy—3 slopes.

NICOLA-PRINCETON INSPECTION DISTRICT.

The collieries in this district were inspected during the year by Inspectors from the Nanaimo and Fernie offices.

The collieries operating during the year in this Inspection District, including the new mines that have been started, were:—

Nicola Valley: The Middlesboro Colliery of the Middlesboro Collieries, Limited, Merritt—Nos. 2, 3, 4, 5, 6, and 7 mines.

Inland Coal and Coke Syndicate, Merritt—One shaft and 3 slopes.

Fleming Coal Company.

Princeton: Princeton Coal and Land Company's Princeton Colliery—No. 1 slope.

Coalmont: Columbia Coal and Coke Company, Limited—Developing only.

EAST KOOTENAY DISTRICT.

The East Kootenay District is subdivided into two Inspection Districts—i.e., Northern Inspection District and Southern Inspection District. Both these districts are inspected by Robert Strachan as Senior Inspector and Wm. Lancaster, Inspector with headquarters at the Mine-rescue Station at Fernie.

NANAIMO INSPECTION DISTRICT.

REPORT BY JAMES DICKSON, INSPECTOR.

I have the honour to submit my annual report for the year ending December 31st, 1919, on the various coal-mines in my inspectorate, consisting of the Canadian Western Fuel Company, Pacific Coast Coal Mines, Nanoose Collieries, and the British Columbia Collieries, all in the Nanaimo Inspectorate.

A short description is given of each colliery in the district, with names of certified officials.

MINE-RESCUE AND FIRST-AID WORK.

I am pleased to be able to report that active interest has been displayed in rescue-training and first-aid work in this district. A number of men have studied first-aid work and qualified for the St. John Ambulance certificate during the year.

The service rendered by the trained first-aid man in the mine can be properly appreciated only by the persons who receive injuries in the course of their work, and who, but for the first-aid man, might have a considerable time to wait and a long distance to travel before receiving proper treatment.

A number of men have gone through the regular course of training in mine-rescue work at the Nanaimo Mine-rescue Station under the capable supervision of John D. Stewart, who is in charge of this station. The training included the use of the Draeger and the Gibbs apparatus in addition to lectures on the machine. There were ten periods of two hours each in the training-gallery, which contains an irrespirable atmosphere, so that conditions are as near as possible to what would naturally exist in a mine after a fire or explosion. The training is very arduous work and the men who take up this work in addition to their daily labour underground are to be highly commended.

In accordance with the requirements of the "Coal-mines Regulation Act," all officials, except those physically unfit, are required to take a course in rescue-work. This year the Chief Inspector of Mines requested the various companies to see that any officials who were physically unfit to take the full training attended the rescue-station for a course of lectures on the machine, so that in case of need they would be able to assist. A special certificate is given to each man who is found proficient at the termination of the lectures.

The rescue-station has been ready at all times to meet any emergency calls, but fortunately there was no accident where the apparatus was required.

On one occasion the spontaneous heating in some pillar-workings in the south side of No. 1 shaft required the use of the apparatus in sealing off the affected section. Mr. Stewart supervised the use of the apparatus underground on this occasion. The use of the apparatus made easy work of an operation which otherwise might have been difficult and dangerous.

The Canadian Western Fuel Company.

Head Office—Nanaimo, B.C.

Capital, $1,500,000.

Officers.	*Address.*
G. W. Bowen, Vice-Chairman,	Nanaimo, B.C.
Mark Bate, Jr., Secretary-Treasurer,	Nanaimo, B.C.
John Hunt, General Superintendent,	Nanaimo, B.C.
T. R. Jackson, Mine Manager, No. 1 Mine,	Nanaimo, B.C.
David Brown, Mine Manager, Reserve Mine,	Nanaimo, B.C.
Robert Henderson, Harewood Mine,	Nanaimo, B.C.
William Moore, Wakesiah Mine,	Nanaimo, B.C.

The above company has operated the following collieries at Nanaimo during the past year, namely: No. 1 or Esplanade shaft, Nanaimo; Protection Island mine, Harewood, and Reserve.

The following returns show the combined output of all the company's mines for the past year:—

AGGREGATE RETURNS FROM CANADIAN WESTERN FUEL COMPANY'S MINES FOR YEAR 1919.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	310,888			
" export to United States	171,415			
" " other countries				
Total sales		482,303		
Used under colliery boilers, etc.	92,267			
Lost in washing	61,676			
Total for colliery use		153,943		
		636,246		
Stocks on hand first of year	43,292			
" last of year	45,611			
Difference added to stock during year		2,319		
Output of collieries for year		638,565		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	43		28		71	
Whites—Miners	489				489	
Miners' helpers						
Labourers	284		182		466	
Mechanics and skilled labour	102		141		243	
Boys	55		37		92	
Japanese						
Chinese—Labourers			128		128	
Indians	4				4	
Totals	977		516		1,493	

NANAIMO COLLIERY.

Thomas R. Jackson, Manager.

No. 1 SHAFT, ESPLANADE.

Edward Courtenay, Overman, North Side; Robert Adams, James McMeakin, John Hamilton, Frank Jaynes, Joseph Dean, John Sullivan, William Johnson, James Dudley, Ernest Kelly, John Blinkhorn, George Jardine, George Stewart, William Halliday, Joshua Norris, George Perry, John Marrs, John Shipley, Elias Rogers, and Thos. W. Woods, Firebosses.

Access to this mine is given by three shafts—No. 1 shaft, Protection shaft, and Newcastle shaft—and work is carried on in the Douglas and Newcastle seams. The Newcastle seam is from 3 to 3.5 feet thick and is worked by the long-wall method. In some sections the mining is done by hand, but most of the output is produced by machine-mining. Where the ground is faulty or the face is not extensive the mining is done by the "puncher" machine, and where there is sufficient length of face to warrant it the long-wall machine known as the "pick quick" is used. Both machines give good results in this seam.

The "pick quick" machine undercuts the coal to a depth of 6 feet, after which it is drilled and shot down. The coal is loaded into cars by loaders working under the direct supervision of a faceman. This faceman is a certificated miner. The coal loaded from the long-wall workings is hauled by rope-haulage to No. 1 Main level, after which it is hauled by electric motors to No. 1 shaft. In this part of the mine the Douglas seam is worked in the sections known as Protection pillars and Lamb's incline. In Lamb's incline, where the pillars are being drawn, the gob is well supported by cogs.

The ventilation in these districts is produced by a Guibal force-fan, 9 x 18 feet, rope-driven at 70 revolutions a minute by a 100-horse-power engine. This fan is capable of producing 100,000 cubic feet of air a minute at a 2-inch water-gauge. There is also an emergency fan at Newcastle shaft.

On the last examination I found 66,000 cubic feet of air passing down the Protection slope, dividing into four splits.

No. 1 Slope.—There was 12,500 cubic feet of air a minute passing into this section for the use of twenty-six men and four horses. The timbering was well done and the section in fair condition generally, and no explosive gas was found.

No. 2 Slope.—There was 14,000 cubic feet of air a minute passing into this section for fifty men and six horses.

No. 3 Slope.—There was 10,000 cubic feet of air a minute passing into this section for the use of forty-four men and six horses. The Burrell gas-detector showed 0.2 per cent. of methane.

Lamb's Incline.—There was 5,400 cubic feet of air a minute passing into this split for the use of thirty-two men and four horses. This section was well timbered in the roadways and the gob was well packed with cogs. No explosive gas was found. The Burrell gas-detector did not show any gas present.

South Side of No. 1, Nanaimo.

Robert Laird, Overman; John Weeks, Frank Green, Matthew Gunniss, Alex. Coombs, George Bradshaw, William Neave, Matthew Broderick, and Moses Woodburn, Firebosses.

The workings are all in the Douglas seam and, except for one prospecting-tunnel, are confined to the extraction of pillars.

The South side of this mine has been much troubled during the past few years by spontaneous combustion, which has at times interfered with the operation of the mine. During the past year several instances have occurred which necessitated sealing off the part affected.

The company maintains a crew of men experienced in this work, and immediately any heating starts, which is generally detected by the smell, all the openings leading to the suspected place are sealed. By means of chains of stoppings the pillar-workings are subdivided into comparatively small sections, so that it is easy to isolate any particular part without interfering with the general operations.

The Main slope was reopened during the year, and a rock tunnel, known as No. 8 North level, has been driven a distance of 350 feet. The coal found so far has proved disappointing, but prospecting is being continued. With the above exception, all the operations on the South side are retreating.

The ventilation is produced by a 72- x 90-inch double-inlet Sirocco fan, rope-driven, ratio 3½ to 1, capable of producing 195,000 cubic feet of air a minute at 4-inch water-gauge, and is driven by an engine of 350 horse-power. A duplicate ventilation installation is kept in readiness for any emergency.

On my last inspection I found the following to be the condition of the ventilation in the various splits:—

Simms Dip Section.—There was 9,000 cubic feet of air a minute passing into this section for the use of twenty men and three horses. This section was well timbered and in fair condition generally. Burrell gas-detector showed 0.4 per cent. methane. This section is fairly free from coal-dust.

Right Incline Section.—There was 3,000 cubic feet of air a minute passing into this section for the use of five men and one horse. Timbering and roadways in good condition. Burrell gas-detector showed 0.4 per cent. methane. This section is fairly free from coal-dust.

Farmer's Incline Section.—The ventilation was poor in this section and on this occasion, especially at the working-faces. The attention of the management was drawn to this and it was remedied at once. There was 3,000 cubic feet of air passing into this section for the use of sixteen men and three horses. The timbering and roadways were in fair condition. The Burrell gas-detector showed 0.9 per cent. of methane. There is no shot-firing in this section, as it is considered a dusty section.

No. 7 Level.—There was 5,000 cubic feet of air a minute passing into this section for the use of eighteen men and two horses. Roadways and timbering in good condition. Burrell gas-detector showed 0.6 per cent. methane.

No. 2 South Section.—There was 3,000 cubic feet of air a minute passing into this section for the use of ten men and two horses. Timbering and roadways in good condition. Burrell gas-detector showed 0.3 per cent. of methane. Main return showed 0.4 per cent. of methane, with 30,000 cubic feet of air a minute passing.

The following are the official returns from the No. 1 shaft and Protection Island collieries for the year 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	165,686			
" export to United States	91,354			
" " other countries				
Total sales		257,040		
Used in making coke				
Used under colliery boilers, etc.	46,784			
Lost in washing	25,348			
Total for colliery use		72,132		
		329,172		
Stocks on hand first of year	34,067			
" last of year	24,096			
Difference taken from stock during year		9,971		
Output of colliery for year		319,201		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	19		14		33	
Whites—Miners	236	7.86			236	
Miners' helpers						
Labourers	180	5.21-5.38	83	4.25-5.73	263	
Mechanics and skilled labour	61	5.75-6.43	68	5.86-7.08	129	
Boys	25	2.98-4.87	11	2.22-4.15	36	
Japanese						
Chinese			58	2.82-3.85	58	
Indians						
Total	521		234		755	

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MAR 19 1921

RESERVE MINE.

David Brown, Manager; Francis John, Overman; George Moore, Benjamin Cheetham, Fred Ball, John Walbank, Harry Meikle, Allan Ford, Fred Hilley, James Knowles, John Ovington, George Frater, and Albert Manifold, Firebosses.

The mine is situated in what is known as the Cranberry district, about five miles south of No. 1 shaft, Nanaimo. The coal is reached by two shafts at a depth of 955 feet, from which a rock tunnel 8 x 10 feet in area is driven across the measures on a 1-per-cent. grade to the rise. The tunnel tapped the seam at a distance of 180 feet.

The shaft-bottom is laid out in a most up-to-date method for handling large quantities of coal. All the tracks are laid with 30-lb. rails and on a grade of 1 per cent. up from the shaft. All the main tunnels leading to this shaft are timbered with 12- x 12-inch timbers.

The seam worked in this mine is the Douglas, the thickness of which varies from 1 to 20 feet. The pitch varies from 10 to 50 degrees and is generally dipping north or north-east. The coal is mostly of a soft nature, with a fairly strong shale roof, while the floor is generally black shale, sometimes mixed with boulders of hard rock.

The coal in the No. 1 West heading varies from 5 to 10 feet in thickness and is of a very hard nature. There is a diamond-drill hole down a considerable advance behind this heading and in about 9 feet of coal. If the present thickness of coal continues in this No. 1 West heading, a large tunnel will be driven on a 1-per-cent. grade, back of No. 1 hoisting-shaft, and connect with the shaft about 150 feet above the present shaft-bottom.

The ventilation of the mine is produced by a pair of 90-inch Sirocco fans, connected to a 20 x 30 engine, rope-driven. On the engine is a drive-wheel 17 feet in diameter and on the fan-shaft a drive-wheel 5 feet in diameter; these fans, running with an engine-speed of 16 revolutions a minute, produce 140,000 cubic feet of air a minute in the fan-drift, with a 3-inch water-gauge. The fan and engine are installed on a concrete foundation 80 feet from the shaft.

The air is carried along the main levels on both sides of the mine and maintained by permanent stoppings of 12- x 12-inch timbers between the intake and return airways, these being kept close up to the face of the levels. The main intakes are naturally damp and systematic watering is carried out in the main places and around the chutes. There is very little gas found in the workings and analysis of the return shows a low per cent.

The mechanical haulage is all carried on by means of compressed-air winches, of which there are twelve in use. The pillars have been withdrawn in two small prospect sections which did not prove of sufficient value to warrant their continuation. One section in which pillars are being withdrawn was stopped owing to striking a fairly large feeder of water. Pillars are being extracted in all sections of this mine, but prospecting is being carried on by means of two pairs of headings about 2,000 feet apart. These headings are being driven up the full pitch of the seam and at the last inspection appear to be approaching a better part of the seam.

The following is the general condition of this mine on my last inspection:—

No. 1 West Section.—There was 15,000 cubic feet of air a minute passing for the use of twenty-eight men and three horses. This section was well timbered and in good condition generally. The Burrell gas-detector showed 0.2 per cent. methane. This section is fairly free from coal-dust.

No. 8 Section.—There was 8,750 cubic feet of air a minute for the use of eighteen men. This section was well timbered and the roadways were in good condition and free from dust, except No. 8 chute. The attention of the management was directed to this. The Burrell gas-detector showed 0.2 per cent. of methane.

East Level.—There was 15,000 cubic feet of air a minute passing for the use of thirty men and three horses. The timbering and roadways were in good condition generally and fairly free from coal-dust. The Burrell gas-detector showed 0.3 per cent. of methane.

West Slant.—There was 10,600 cubic feet of air a minute passing for the use of fourteen men and two horses. The timbering and roadways were in good condition and fairly free from coal-dust. The Burrell gas-detector showed 0.4 per cent. of methane.

Main Return.—There was 60,000 cubic feet of air passing a minute. The Burrell gas-detector showed 0.3 per cent. of methane.

Owing to trade conditions this mine was closed down from the end of May to August, when work was resumed.

The following are the official returns of the Reserve Colliery for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	38,809			
" export to United States	21,398			
" " other countries				
Total sales		60,207		
Used under colliery boilers, etc.	16,081			
Lost in washing	5,370			
Total for colliery use		21,451		
		81,658		
Stocks on hand first of year	3,142			
" last of year	435			
Difference taken from stock during year		2,707		
Output of colliery for year		78,951		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	11		5		16	
Whites—Miners	91	7.32			91	
Miners' helpers						
Labourers	55	5.21 - 5.38	32	4.25 - 5.73	87	
Mechanics and skilled labour	22	5.75 - 6.43	25	5.86 - 7.08	47	
Boys	18	2.98 - 4.87	7	2.22 - 3.85	25	
Japanese						
Chinese		5.21 - 5.38	30		30	
Indians	4				4	
Totals	201		99		300	

HAREWOOD MINE.

Robert Henderson, Manager; John White, Overman; Alex. Bryden, James Hanlon, Joseph Dykes, John Kirkwood, John Sutherland, Henry Carroll, and William Watson, Firebosses.

Harewood mine was first opened about forty years ago, when the coal-outcropping at the bluff was worked for a small area. Operations were eventually suspended.

The mine was again opened in 1902, when a shaft was sunk to the dip of the old workings, entering the seam at a depth of 150 feet. Coal was worked to the rise and a pair of headings driven up to the old workings, when operations were again suspended in 1904.

The present operations were commenced in 1917. In August the tunnel driven by the first operations was cleared out, and the coal was reached about 1,000 feet from the present tunnel. Operations on the coal were commenced at the top of the old slopes, when skips were taken from the pillars until the coal-faces were reached, when a level was commenced and driven until a fault was struck in May, 1918.

At a point where the original face was, an incline was driven up and holed at the surface outcrop in the bluff 1,200 feet south of the old entrance. Coal is being worked to the right and left of this incline and varies from 2 to 12 feet in thickness.

The other workings are to the dip of No. 1 level, and the old slope is used as a haulage-road. No. 2 level is some 300 feet down and runs parallel to No. 1 level. Narrow skips were taken from the bottom of the pillars to make a roadway to the old face, where rock was encountered in such quantities that operations were suspended. The workings at the present are to the dip of this level and about 300 feet from the old face. This level has been driven about 750 feet from the level, but so far has been unable to penetrate through the rock to the south. Most of the working-faces are now being driven in the direction of the old slope and expect shortly to hole into the old pillars that were worked from the old shaft. The coal was taken out of the pillars between Nos. 1 and 2 levels during the operations in 1902 and 1904.

No. 3 level is some 250 feet farther down the slope from No. 2, to which it runs parallel, and the coal was worked to the dip until operations were suspended by a series of large faults. These pillars and the pillars between Nos. 2 and 3 levels are left and will not be extracted until the last operations. This No. 3 level is abandoned and now used as a return airway.

Nos. 4, 5, and 6 levels were started from the slope and driven in the same direction as the other levels. The area here was so broken up by faults that No. 6 was cut out and No. 5 driven up to No. 4, and this level now carries all the workings which were holed through to the places from the dip of No. 2 level.

The most important development during the year was the rock tunnel known as the south-west heading. This heading, after going in rock for a considerable distance, found coal about 6 feet thick. This part of the property is now being developed.

The haulage is performed by two electric locomotives and three electric hoists. The motors are used on the Main and No. 1 levels, and winches are used, one to pull out of No. 2 level dips, one from the slope, and one on No. 1 incline. The coal is all concentrated on No. 1 level and taken to the tunnel-mouth by the motors.

The air-current is at present divided into two splits, and there are two intakes, one by way of the tunnel and the other from the opening at the outcrop at the bluff. This current supplies No. 1 split, which comprises the workings of Nos. 1 and 2 inclines, and is passed over Nos. 1 and 2 levels by overcasts, returning down old No. 3 level over the slope and overcast to the counter-slope, and thence to the upcast shaft. No. 2 ventilates the No. 1 level and is taken from the tunnel intake current. After passing the working-faces the air joins No. 1 split air below No. 1 level overcast. The No. 2 split ventilates Nos. 2 and 3 levels and is taken down the slope for the tunnel intake, and after passing around the working-places is taken down the Main slope to the shaft.

The ventilation is produced by a Murphy fan placed near the top of the shaft. The pressure is 2.5 lb. to the square foot, and the total quantity is about 40,000 cubic feet a minute.

The power-house is also situated at the shaft and comprises two return-tubular boilers of 120 horse-power each and a Nagle engine coupled direct to the generator. The voltage is 250, with a capacity of 750 amperes. The screening plant comprises one shaker and one revolving screen, with a revolving dump, all of which are electrically driven.

In the shaft a manway is provided with ladders; a pump is stationed at the bottom to handle the mine-water. The drainage to this point is by gravity, and although the mine is fairly dry, considerable surface water is handled in the winter.

On my last examination I found 36,000 cubic feet of air a minute passing into the mine, dividing into two splits.

No. 1 Split.—There was 25,000 cubic feet of air a minute passing for the use of thirty-two men and seven horses.

No. 2 Split.—There was 11,000 cubic feet of air a minute passing for the use of fifty-nine men and eight horses. This mine was well timbered and is free from explosive gas and coal-dust. The Burrell gas-detector did not show methane present.

The following are the official returns of the Harewood Colliery for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	103,510			
" export to United States	57,073			
" " other countries				
Total sales		160,583		
Used in making coke				
" under colliery boilers, etc	28,550			
Lost in washing	28,863			
Total for colliery use		57,413		
		217,996		
Stocks on hand first of year	6,083			
" last of year	21,080			
Difference added to stock during year		14,997		
Output of colliery for year		232,993		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	10		7		17	
Whites—Miners	131	9.07			131	
Miners' helpers						
Labourers	41	5.21 - 5.38	52	4.25 - 5.73	93	
Mechanics & skilled labour.	14	5.75 - 6.43	42	5.86 - 7.08	56	
Boys	9	2.98 - 4.87	17	2.22 - 4.15	26	
Japanese						
Chinese			33	2.82 - 3.85	33	
Indians						
Totals	205		151		356	

WAKESIAH MINE.

William H. Moore, Manager; Thos. Jordan, Arthur Challoner, and Isaac Hill, Firebosses.

This mine is situated on the Canadian Western Fuel Company's farm, about two miles from Nanaimo, and is connected by a spur with the Harewood branch line. Two shafts were sunk to a depth of 320 feet and a pair of levels driven about 1,200 feet in a general south-westerly direction. Considerable difficulty was encountered with faults, etc., but at the present the prospects are good for rapid development, as a good seam of coal has been struck, varying from 3 to 12 feet in thickness. The output is now about 250 tons daily. Haulage is being carried on by means of two compressed-air winches supplemented by horses. The water is taken care of by a Duplex and two small Cameron pumps. Stables have been built underground. The methods of working are by pillar and stall and long-wall. In the former 60-foot pillars are left, stalls being driven 16 to 20 feet wide, levels 10 x 12 feet wide, timbered on 3½-foot centres.

The "pick quick" mining-machine is used in the long-wall, while the Siscol and Rand punchers are used in some of the stalls. The Denver clipper-drill is used for drilling. Safety-lamps only are used underground, except a few electric cap-lamps.

Ventilation is produced by means of a single-inlet, belt-driven Murphy fan operated as a blower, producing about 30,000 cubic feet of air a minute at 160 revolutions a minute.

The mine is damp and free from coal-dust. A small shaker screen making three grades of coal is used to prepare the product, while suitable railroad sidings have been built. The hoist is a 14- x 18-inch first-motion engine, to which steam is supplied by two 80-horse-power tubular boilers at 120 lb. pressure. A 6/19 1⅛-inch rope is used at No. 2 shaft, which is used temporarily as the hoisting-shaft until the permanent machinery is installed.

No serious accidents have yet been reported, notwithstanding the rather frail roof, and every possible effort is being put forth to maintain the enviable reputation in this respect. The rest of the plant is as reported last year.

On the occasion of my last inspection there was 21,000 cubic feet of air a minute passing for thirty-five men and three horses. This mine is practically free from coal-dust and no explosive gas was found. Burrell gas-detector showed 0.2 per cent. of methane.

The following are the official returns from the Wakesiah Colliery for the year 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	2,883			
" export to United States	1,590			
" " other countries				
Total sales		4,473		
Used in making coke				
Used under colliery boilers, etc.	852			
Lost in washing	2,095			
Total for colliery use		2,947		
		7,420		
Stocks on hand first of year				
" last of year				
Difference added to stock during year				
Output of colliery for year		7,420		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	3		2		5	
Whites—Miners	31	8.49			31	
Miners' helpers						
Labourers	8	5.21-5.38	15	4.25-5.73	23	
Mechanics and skilled labour	5	5.75-6.43	6	5.86-7.08	11	
Boys	3	2.98-4.87	2	2.22-4.15	5	
Japanese						
Chinese			7	2.82-3.85	7	
Indians						
Totals	50		32		82	

British Columbia Coal Mining Co., Ltd., and Vancouver-Nanaimo Coal Mining Co., Ltd.

Head Office—Nanaimo, B.C.

Capital, $300,000.

Officers.	*Address.*
William Warner, President,	17 Williams Bldg., Vancouver, B.C.
Howard Gallagher, Secretary-Treasurer,	P.O. Box 834, Nanaimo, B.C.
S. K. Mottishaw, Superintendent,	Nanaimo, B.C.

Value of plant, $100,000.

NEW EAST WELLINGTON COLLIERY.

Samuel K. Mottishaw, Manager; Joseph Thompson, Overman; Wm. Park and Geo. Oswald, *Firemen.*

This mine is practically finished, as all the pillars, with the exception of those immediately around the foot of the slope, have been extracted. The plant is the same as reported last year. On the occasion of my last inspection the ventilation was as follows:—

No. 1 Split.—There was 12,000 cubic feet of air a minute passing for the use of nine men and one horse.

No. 2 Split.—There was 13,000 cubic feet of air a minute passing for the use of thirteen men and two horses. The workings were well timbered and no explosive gas was found.

The Burrell gas-detector in the main return showed 0.4 per cent. of methane.

The following are the official aggregate returns for the year ending December 31st, 1919, for the two companies which operated the No. 1 East Wellington Colliery during the year:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	24,259			
" export to United States	5,262			
" " other countries				
Total sales		29,521		
Used in making coke				
Used under colliery boilers, etc.	8,804			
Total for colliery use		8,804		
		38,325		
Stocks on hand first of year	1,330			
" last of year				
Difference taken from stock during year		1,330		
Output of colliery for year		36,995		

Pacific Coast Coal Mines, Limited.

Head Office—Victoria, B.C.

Capital, $3,000,000.

Officers.	*Address.*
James Carruthers, President,	Montreal, Que.
J. H. Paine, Vice-President and Managing Director,	Victoria, B.C.
Douglas Muir, Secretary-Treasurer,	Victoria, B.C.
Robert Bonar, Superintendent,	South Wellington, B.C.

MORDEN MINE.

Robert Bonar, Manager; Thos. Taylor, Overman; John Donnachie, Thos. Robson, Hy. Winstanley, Neil McIntyre, William Brown, and Peter Carr, Firebosses.

This mine is operated on the Douglas seam and is situated on Section 11, Range 8, Cranberry district, and about two miles from the town of South Wellington.

The plant consists of three 150-horse-power Goldie & McCulloch 72- x 18-inch boilers, 160 lb. working-pressure; one pair 24 x 36 hoisting-engines equipped with safety overwinding device, steam-brake; two 10-foot sheaves with collars and boxes and two self-dumping cages; one Gwynnes 5-inch centrifugal pump direct-connected to 250-volt a.c. motor; two 150-kw. electrical generators connected to two Goldie & McCulloch 13 x 20 x 9 high-speed engines; five electrical motors, 400-volt, Iron Works fan-engine; one Marcus screen 65 feet long, one Marcus screen 63 feet long, both with double decks and doors; one Weir feed-pump.

The mine is entered by two shafts sunk to a depth of 600 feet; the main shaft is 9 x 16 feet and the air-shaft 9 x 12 feet in the clear.

A new shaft-bottom has been completed below the level of the old one, with two slopes driven direct from the bottom of the shaft, which will pass through the centre of the company's property.

The ventilation is produced by a Sheldon double-entry fan 7 feet in diameter, driven by a 16- x 12-inch engine made by the Vulcan Iron Works, built on reinforced-concrete foundation. There has also been installed an up-to-date motor ambulance, which has been a great benefit not only to the mine, but to the surrounding district as well.

Extensive development underground has been carried on during the year. The new shaft-bottom has been widened to allow the handling of more coal. The Main slope has been driven through almost 900 feet of rock-fault and has again struck coal; although only 4 feet high, it is of very good quality. A main diagonal slope has been turned off the Main slope, and will replace the old slope which has been abandoned on account of the haulage system. This new development-work is being pushed ahead as speedily as possible, as the Main slope, striking this big fault, seriously delayed development.

The coal is well adapted for steam purposes and varies from 3 to 30 feet in thickness. The mine is worked exclusively by safety-lamps of the Wolf pattern, and only permitted explosives are used, fired by electric battery.

No. 4 shaft or return-air shaft is now being used exclusively as an emergency shaft. An engine with steam on and a hoisting-cage in the shaft is always ready to hoist the men in case of emergency.

On my last inspection there was 60,000 cubic feet of air a minute passing into this mine, all the workings being on one split, for the use of fifty-seven men and four horses. There was explosive gas found in six working-places on this day, on account of which the management was notified to suspend the firing of shots until the ventilation was improved. This mine is fairly free from coal-dust, except No. 1 North haulage-road and No. 4 Right haulage-road. The management remedied these matters at once. The timbering was in good order and the Burrell gas-detector showed 0.3 per cent. of methane.

At Morden mine the plant consists of three 150-horse-power and two 100-horse-power return-tubular boilers; one pair 24 x 36 hoisting-engines with safety overwinding device, with steam-reverse and steam-brake; two 10-foot sheaves and two self-dumping cages; one Canadian Rand cross-compound air-compressor; two 150-kw. electrical generators connected with 13 x 20 x 9 high-speed engines; one Sheldon ventilating mine-fan, direct-connected to a 17- x 20-inch engine, also motor-driven as auxiliary. Upcast air-shaft is also equipped with steam-hoist and cage as the emergency outlet. All machinery for handling coal is electrically driven. There is a thoroughly equipped machine-shop and also mine-rescue station, containing two sets of Gibbs rescue apparatus complete, capacity four to eight hours. A standard-gauge railway seven miles and a half long connects the mines with Boat harbour, the shipping-point, equipped with wharves and bunkers which will accommodate the largest ocean-going steamers.

The following are the official returns from Morden Colliery for year ending December 31st, 1919:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	36,259			
" export to United States	21,384			
" " other countries				
Total sales		57,643		
Used in making coke				
Used under colliery boilers, etc	16,744			
Lost in washing	9,876			
Total for colliery use		26,620		
		84,263		
Stocks on hand first of year	410			
" last of year	320			
Difference taken from stock during year	90	18,420		
Coal reclaimed from dump	18,330			
Output of colliery for year		65,843		

Number of Hands employed, Daily Wages paid, etc.

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	7	6.40 - 9.00	6	2.85 - 6.00	13	2.85 - 9.00
Whites—Miners	62	5.70 - 7.30			62	5.70 - 7.30
Miners' helpers	19	5.00			19	5.00
Labourers	41	4.94 - 5.72	14	5.00	55	4.94 - 5.72
Mechanics and skilled labour	3	5.37 - 6.00	31	4.50 - 6.70	34	4.50 - 6.70
Boys	9	3.75	5	3.00	14	3.00 - 3.75
Japanese						
Chinese			34	3.00	34	3.00
Indians						
Totals	141		90		231	

The Nanoose Collieries Co., Ltd.

Head Office—Vancouver, B.C.

Officers.	*Address.*
L. Williams, President,	Smith Bldg., Seattle.
F. H. Lantz, Vice-President,	
John A. Coleman, Secretary-Treasurer,	Vancouver, B.C.
John John, Superintendent,	Wellington, B.C.

Value of plant, $200,000.

NANOOSE COLLIERIES.

John John, Manager; Chas. Simister, John Michie, John McLeod, Fred Jarrett, and Arch. McBroom, Firemen.

This mine is situated at Nanoose Bay, about five miles in a north-westerly direction from what is known as North Wellington, which was formerly worked under the old Dunsmuir Company, and is known as the Old Wellington seam.

A shaft 8 x 16 was sunk on the property a distance of 133 feet, with levels turned off east and west. The coal varies from 3 to 4 feet in thickness, lying in two benches, with rock varying from 2 to 5 feet in thickness between the coal. The hoisting is carried on in the shaft and the slope is used as a travelling-way for the men and for ventilation.

The seam here is generally in two parts, with a shale, which occurs in thickness from 2 to 6 feet, between. The coal is hard and of good quality and finds a ready market. The seam up to the present time has been subject to considerable disturbance and is very irregular. All the workings so far have been on the pillar-and-stall system.

The plant now consists of three boilers with a total horse-power of 360, two compressors delivering 950 cubic feet of free-air a minute and a first-motion hoisting-engine of 75 horse-power.

Electrical power is generated by a 150-kw. generator, this power being used extensively in the screening and washing plant. The storage-bunkers have a capacity of 1,000 tons, the coal being conveyed from these bunkers to the shipping-points by means of cars.

There was 17,500 cubic feet of air a minute passing for the use of forty-six men and four horses. No explosive gas was found and the airways and roadways were in good condition.

The following are the official returns for the year ending December 31st, 1919:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	9,788			
" export to United States	10,473			
" " other countries				
Total sales		20,261		
Used in making coke				
" under colliery boilers, etc.	1,372			
Total for colliery use		1,372		
Stocks on hand first of year	104			
" last of year	113			
Difference added to stock during year		9		
Output of collieries for year		21,642		

COMOX INSPECTION DISTRICT.

REPORT OF HENRY DEVLIN, INSPECTOR.

I have the honour to submit my annual report as Inspector of Mines for the Comox Inspection District of Vancouver Island for the year ending December 31st, 1919, together with a list of all accidents and colliery returns.

Canadian Collieries (Dunsmuir), Ltd.

Head Office—Montreal, Que.

Capital, $15,000,000.

Officers.	*Address.*
Henry S. Fleming, President,	New York.
F. Perry, Vice-President,	Montreal, Que.
H. S. Adlington, Secretary-Treasurer,	Montreal, Que.
J. M. Savage, General Manager,	Victoria, B.C.
Thos. Graham, General Superintendent,	Cumberland, B.C.

The Canadian Collieries (Dunsmuir), Limited, in 1910 acquired all the holdings of the Wellington Colliery Company, Limited, and since then has been operating the following mines:—

The Extension Colliery, in the Cranberry District (Extension); T. A. Spruston, manager.

The Comox Colliery, in the Comox District; J. W. Montgomery, George O'Brien, J. G. Quinn, managers at the several mines.

The following table shows the combined output of all this company's collieries during the past year:—

AGGREGATE RETURNS FROM THE CANADIAN COLLIERIES, LTD., MINES FOR YEAR 1919.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	454,620		16,429	
" export to United States	174,705			
" " other countries				
Total sales		629,325		16,429
Used in making coke	24,049			
Used under colliery boilers, etc	23,984		76	
Lost in washing	179,687			
Total for colliery use		227,720		76
				16,505
Stocks on hand first of year	7,368		1,744	
" last of year	13,741		104	
Difference {* added to / † taken from} stock during year		*6,373		†1,640
Output of collieries for year		863,418		14,865

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	89		43		132	
Whites—Miners	496				496	
Miners' helpers	23				23	
Labourers	209		97		306	
Mechanics and skilled labour	181		146		327	
Boys	16		38		54	
Japanese	81		1		82	
Chinese	433		268		701	
Indians						
Totals	1,528		593		2,121	

COMOX COLLIERIES.

These mines were formerly operated by the Wellington Colliery Company, but were taken over by the Canadian Collieries (Dunsmuir), Limited, in 1910. The mines are situated in the Comox district, about seventy miles from Nanaimo. A railway about twenty miles in length connects the various mines to a shipping-point at Union Bay, over which the whole output is conveyed.

This company is operating in Cumberland mines known as Nos. 4 and 7 slopes and Nos. 5, 6, and 8 shafts. Nos. 4, 5, and 7 mines have been in continuous operation throughout the year; but there have been no operations in either No. 6 or No. 8 mines during the year.

THE HYDRO-ELECTRIC PLANT.

This plant has been in continuous operation throughout the year. The power-house has been operated satisfactorily and no repairs or improvements were needed.

UNION BAY.

At Union Bay the coke-ovens have been in operation only part of the year. Considerable drilling has been carried out in the Tsaabl River field and indicates the existence of a considerable body of coal in this district.

No. 4 MINE, COMOX.

George O'Brien, Manager; Robert Adamson, Overman, No. 1 Slope; Charles Parnham, Overman, No. 2 Slope; John Bennie and James Quinn, Shiftbosses; Sidney Horwood, Arthur W. Watson, Alfred Jones, Thomas Cunliffe, Hugh M. Davidson, Peter Myers, Richard H. Hodson, Daniel P. Marsh, John Liddle, Henry King, William Beveridge, Louie Franscescini, Robert Reid, Thomas Lewis, Thomas Eccleston, Frederick Hutchinson, Norman W. Huby, John H. Vaughan, John G. Biggs, and John C. Brown, Firebosses.

This mine is situated about two miles from Cumberland and about twenty miles from the shipping-point at Union Bay.

The ventilation is produced in this mine by a Sullivan reversible fan driven by a 350-horse-power motor, direct-coupled, running at 245 r.p.m., and capable of delivering 196,000 cubic feet of air a minute, against a 7-inch water-gauge.

This mine has been in continuous operation during the year. Safety-lamps of the Wolf type and the Edison storage-battery electric lamp are used exclusively in this mine. Where blasting is permitted in this mine it is done with permitted explosives fired by electric battery.

New Work at No. 4 Mine.

The new tipple at this mine was put into operation in March and has given every satisfaction. It contains a 3-car rotary dump and Marcus screens, displacing the old end dump and bar screens. The installation of the rotary dump permits the closing-up of the end gates in the mine-cars, which prevents considerable spilling of coal and coal-dust on the mine roadways.

A storage-battery locomotive and charging equipment for same has been installed in No. 15 West level, No. 1 slope. This is a 5½-ton Ironton locomotive with oxide batteries. This locomotive is running from the top of the new slope in No. 15 West level to the bottom of the Main slope and has given excellent satisfaction to date.

No. 15 East level, No. 2 slope, is being reopened in order to develop an area inside of the large fault on the east side of No. 2 slope. A new bore-hole was put down for power purposes on No. 2 slope and a 6-inch borehole for water-discharge. A new 9-stage turbine-pump, driven by a 200-horse-power motor, has been installed at the foot of No. 2 slope. This pump will handle all the water in No. 2 slope direct through the borehole to the surface. This will cut out three pumps which are at present used to pump this water to No. 1 slope main sump.

No. 1 Slope.

This slope is down a distance of 7,000 feet, running due north. A diagonal slope, 4,000 feet from the entrance of the mine, running N. 45° E., is down a distance of 4,000 feet, where levels are turned off east and west—Nos. 15, 16, 17, 18, 19, and 20 on the West side. There are no operations on the East side of No. 1 slope at the present time, No. 19 East level being used as a travelling-road between Nos. 1 and 2 slopes.

The new slope driven off No. 15 West level, No. 1 slope, is still going ahead, and Nos. 1, 2, 3, and 4 levels are turned off on the West side and No. 1 level on the East side. These levels are in good coal ranging from 4 to 6 feet in height, with a band of rock running in the centre from 10 to 15 inches thick and having a fairly good roof.

During my last inspection in December I measured 31,000 cubic feet of air a minute passing into this part of the mine, divided into two splits.

In No. 1 split there was 12,500 cubic feet of air a minute passing for the use of fifty-five men and four mules, or an average of 186 cubic feet of air a minute for each unit employed.

In No. 2 split there was 13,000 cubic feet of air a minute passing for the use of fifty-five men and five mules, or an average of 185 cubic feet of air a minute for each unit employed.

I found no explosive gas in No. 1 slope, but found a ⅜-inch gas-cap in No. 19 West level pillars. There is no blasting permitted in No. 19 West pillars. Timbering and roadways were in good condition.

No. 2 Slope.

This slope branches off No. 1 slope a short distance from the mine portal, running N. 45° E., and is down a distance of 9,000 feet and forms the deepest workings of the mine.

No. 2 slope has not been advanced during the year. There has been considerable repair-work done in the return air-courses during the year.

Levels are turned off this slope east and west—Nos. 15, 16, 17, 18, 19, and 20 on the East side. In Nos. 16, 18, and 19 levels on the East side are all pillar-extraction, only No. 20 East level being driven in the solid.

Nos. 17 and 20 are the only levels operating on the West side of No. 2 slope. Pillar-extraction in No. 17 West level, and No. 20 West level being driven in the solid with fairly good prospects.

When I made my inspection in December I measured 50,000 cubic feet of air a minute passing into No. 2 slope, divided into three splits.

In No. 1 East split there was 6,500 cubic feet of air a minute passing for the use of sixteen men and two mules, or an average of 290 cubic feet of air a minute for each unit employed.

In No. 2 East split there was 22,000 cubic feet of air a minute passing for the use of forty-five men and eight mules, or an average of 318 cubic feet of air a minute for each unit employed.

In the West side split there was 12,500 cubic feet of air a minute passing for the use of nine men and one mule, or an average of 1,000 cubic feet of air a minute for each unit employed.

I found a small quantity of explosive gas in the following places in No. 2 slope: In a crosscut off No. 18 stall off No. 16 East level in face of No. 12 stall, and crosscut off No. 13 stall off No. 19 East level; also a slight gas-cap travelling in the air-current on the return side of No. 19 East level. Timbering and roadways were in good condition and the mine fairly free from coal-dust.

I made tests with the Burrell gas-detector in the several splits and main return airways, with the following results: No. 1 split, No. 1 slope, showing 0.8 per cent. methane in 15,000 cubic feet of air a minute; No. 2 split, No. 1 slope, showing 1.4 per cent. methane in 14,800 cubic feet of air a minute; No. 1 East split, No. 2 slope, showing 1.3 per cent. methane in 7,600 cubic feet of air a minute; No. 2 East split, No. 2 slope, showing 1.6 per cent. methane in 26,000 cubic feet of air a minute; West side split, No. 2 slope, showing 1.4 per cent. methane in 14,800 cubic feet of air a minute; main return showing 0.9 per cent. methane in 165,000 cubic feet of air a minute.

No. 5 Mine, Comox.

William Walker, Manager; Robert Brown, Overman; Samuel Jones, Andrew McKendrick, William Devoy, Duncan Thomson, Thomas S. Wilson, Frank Crawford, John E. Spicer, Thomas Shields, William Harmison, William Bradley, William J. Keenan, Robert Houston, James Brown, and Thomas J. Shaw, Firebosses.

This mine has been in continuous operation during the year. A new lamp-house has been built, and fully equipped with the Edison storage-battery head-lamp anad all the necessary fixings for charging the lamps. The Sirocco fan for ventilating this and No. 6 mine has been in continuous operation during the year and has given every satisfaction.

A rearrangement of screening facilities at this mine was made in April. A Marcus screen was installed in the present tipple, displacing the old bar screen and conveyor arrangement.

A new slope has been driven on the West side of the shaft, which is opening up a promising area in this section of the mine.

When I made my inspection in December I measured 95,000 cubic feet of air a minute passing into the mine, divided into four splits.

In the split on the East side of No. 1 dip East there was 16,500 cubic feet of air a minute passing for the use of thirty-five men and five mules, or an average of 330 cubic feet of air a minute for each unit employed.

In the split on the West side of No. 1 dip East there was 12,500 cubic feet of air a minute passing for the use of thirty men and two mules, or an average of 347 cubic feet of air a minute for each unit employed.

In No. 1 West dip split there was 24,000 cubic feet of air a minute passing for the use of forty-five men and six mules, or an average of 380 cubic feet of air a minute for each unit employed.

In No. 2 dip split there was 18,000 cubic feet of air a minute passing for the use of forty men and six mules, or an average of 327 cubic feet of air a minute for each unit employed.

I found a little explosive gas in J. McAllister's place off No. 4 West level, No. 1 dip East. Timbering and roadways were in good condition and the mine entirely free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: Return from No. 1 East split showing 0.6 per cent. methane in 18,200 cubic feet of air a minute; return from the West side of No. 1 dip East showing 0.3 per cent. methane in 14,500 cubic feet of air a minute; return from No. 1 West dip showing 0.3 per cent. methane in 26,250 cubic feet of air a minute; No. 2 dip split showing 0.2 per cent. methane in 19,000 cubic feet of air a minute; return from Nos. 5 and 6 mines, between Nos. 1 and 2 inclines, showing 0.6 per cent. methane in 85,900 cubic feet of air a minute.

No. 6 Mine, Comox.

William Walker, Manager; Thomas Mordy, Overman.

There has been no coal hoisted from this mine during the year. Practically all the water made in both Nos. 5 and 6 mines is hoisted from No. 6 shaft by specially constructed water-tanks.

When I made my last inspection during December I measured 24,000 cubic feet of air a minute passing around the workings of the mine. I found a little explosive gas issuing from a break in the roof in a slant off No. 2 East level. Timbering and roadways were in fair condition.

No. 7 Mine, Comox.

John G. Quinn, Manager; James L. Brown, Overman; William Herd, Robert Walker, John McMurtrie, Watkin Williams, Daniel McMillan, and James Monks, Firebosses.

This mine has worked continuously during the year. All workings below No. 3 East level have been abandoned on account of the dirty nature of the seam. A rock tunnel was driven through the fault at the face of No. 3 East level to open up a new area in that section of the mine. A slope is being driven in the coal in this area and should develop rapidly.

A new 5½-ton storage-battery locomotive of the same type as that used in No. 4 mine has been installed on No. 3 East level for haulage purposes. A borehole for power purposes was put down at the face of No. 3 East level, and a new electric hoist has been installed on this slope. Compressed air has been almost entirely eliminated from this mine, it only being required in the old sections, which will soon be finished.

When I made my inspection in December I measured 96,000 cubic feet of air a minute passing into the mine, divided into three splits.

In the West split there was 25,000 cubic feet of air a minute passing for the use of twenty-one men and one mule, or an average of 1,037 cubic feet of air a minute for each unit employed.

In No. 1 East split there was 15,000 cubic feet of air a minute passing for the use of twelve men, or an average of 1,250 cubic feet of air a minute for each unit employed.

In No. 2 East split there was 16,000 cubic feet of air a minute passing for the use of twenty-four men, or an average of 666 cubic feet of air a minute for each unit employed.

No explosive gas found in this mine. Timbering and roadways were in good condition and the mine free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: West side split showing 0.2 per cent. methane in 28,000 cubic feet of air a minute; No. 1 East split showing 0.1 per cent. methane in 17,000 cubic feet of air a minute; No. 2 East split showing 0.2 per cent. methane in 18,450 cubic feet of air a minute; main return showing 0.2 per cent. methane in 120,000 cubic feet of air a minute.

The following are the official returns from the Comox Collieries for the year ending December 31st, 1919:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	285,162		16,429	
" export to United States	111,195			
" " other countries				
Total sales		396,357		16,429
Used in making coke	23,816			
" under colliery boilers, etc	7,589		76	
Lost in washing	116,868			
Total for colliery use		148,273		76
				16,505
Stocks on hand first of year	3,752		1,744	
" last of year	11,318		104	
Difference {added to*/taken from†} stock during year		*7,566		†1,640
Output of collieries for year		552,196		14,865

Canadian Collieries—Tipple, No. 4 Mine, Comox.

Canadian Collieries—Portal of Tunnel, No. 4 Mine, Comox.

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage
Supervision and clerical assistance	58		24		82	
Whites—Miners	190				190	
Miners' helpers						
Labourers	179		50		229	
Mechanics and skilled labour	51		102		153	
Boys	16		11		27	
Japanese	81		1		82	
Chinese	428		192		620	
Indians						
Totals	1,003		380		1,383	

Name of seams or pits—Comox mines.

Description of seams, tunnels, levels, shafts, etc., and number of same—Nos. 4, 5, and 6 shafts and Nos. 4 and 7 slopes.

WELLINGTON-EXTENSION COLLIERY.

Thomas A. Spruston, Superintendent; James Strang, Manager, Nos. 1, 2, and 3 Mines.

The general supervision of this colliery is entrusted to Mr. Spruston, who has an overman in charge of each mine. These mines were formerly operated by the Wellington Colliery Company, but, like the Comox Colliery, were taken over by the Canadian Collieries (Dunsmuir), Limited, in 1910.

The Wellington-Extension Colliery, which is composed of Nos. 1, 2, and 3 mines, are situated in the Cranberry district, about six miles by road from Nanaimo and about eleven miles by railway from Ladysmith. No. 5 mine is also in Cranberry district, at South Wellington, about five miles south of Nanaimo. Coal is shipped from the Extension mines over eleven miles of railway to the shipping-wharves at Ladysmith. No. 5 mine shipments are made over the Esquimalt & Nanaimo Railway to the shipping-wharves at Ladysmith. All these mines have been working continuously throughout the year.

Nos. 1, 2, and 3 mines, situated at Extension, are connected by a tunnel driven 14 x 7 in the clear and one mile long, with a double track running practically the whole distance, and operated by a Westinghouse electric locomotive. A wooden flume 18 x 18 inches is laid parallel to the tracks for the whole length of the tunnel to take care of the water from each mine. Electric lights are strung at important points along the tunnel. During the year an elevated rock-dump has been installed with self-dumping skips, operated by an electric hoist with a 1-inch wire rope attached.

The change and wash house which was erected in the latter part of 1917 continues to give every satisfaction, being maintained up to the standard for the welfare of the men going and coming from their work. Additional lockers have had to be installed during the present year to accommodate the ever-increasing applicants, as they find the advantage of the luxury after coming off shift. (For description of power-house equipment and plant at Extension *see* Minister of Mines' Report for 1917.)

A fully equipped rescue-station is kept and maintained in good condition at Extension, with work-room, observation-room, smoke-room, and dressing-room fitted with lockers, bath, and wash-basin. The equipment consists of four 2-hour sets of Draeger apparatus (1917 type), one oxygen-pump, four oxygen-tanks, one pulmotor, and electric safety of the Draeger and Edison type.

LADYSMITH.

During the year shipping and railway-car service has been steady. The coal-washery, which is situated at this point, consists of three "washers" of the following dimensions: Nos. 1 and 2, diameter 8 feet 9 inches, depth 5 feet 6 inches; No. 3, diameter 8 feet 3 inches, depth 5 feet 9 inches; computed capacity of each washer 300 tons in twelve hours. A Masco table 14 x 17 feet handles the fines or waste recovery and is giving good results.

Power for the washery is supplied by a Pelton wheel which is operated from the mountain water source. An auxiliary salt-water pumping plant has been installed near the beach to supply the washery in an emergency, such as the mountain water-supply giving out or during a hard frosty spell.

No. 1 OR TUNNEL MINE, EXTENSION.

James Strang, Manager, Nos. 1, 2, and 3 Mines; William Wilson, Overman; David J. Gordon, Thomas Wilson, William Wesnedge, John Greenhorn, James Glen, and William Clifford, Firebosses.

This mine is worked on the long-wall system, hand-mining being employed. The Main slope is down a distance of 4,000 feet; Nos. 2 and 3 slopes are turned off to the south-west at points 1,800 feet and 3,200 feet off Main slope.

Levels are turned off east and west of these slopes, leaving a slope pillar 100 feet in thickness, from which the advance system of long-wall was commenced. The condition of this mine, although somewhat troubled with thin coal and shale-bands in the coal, is looking fairly promising. Safety-lamps of the Wolf type and the Edison storage-battery electric lamps are used throughout the mine, and all blasting is done with permitted explosives, fired by electric battery.

The mine is ventilated by a Murphy-type exhaust-fan with a capacity of 45,000 cubic feet of air a minute, against a 1.7-inch water-gauge, driven by an Allis-Chalmers-Bullock motor.

When I made my last inspection of this mine I measured 23,100 cubic feet of air a minute passing into the mine for the use of fifty-four men and five mules, or an average of 334 cubic feet of air a minute for each unit employed.

No explosive gas was found, but found a slight gas-cap in a slant off No. 1 East level, No. 3 slope. I found timbering and roadways in good condition and the mine free from coal-dust.

Test made with the Burrell gas-detector in the main return airway showed 0.4 per cent. methane in 26,500 cubic feet of air a minute.

No. 2 MINE, EXTENSION.

Robert L. Spruston, Overman; Robert N. Hamilton, Owen Dabb, Joseph Watson, Joseph Mason, John Davidson, Edward Heyes, John Wright, and William Cosier, Firebosses.

This mine is divided into three districts—namely., No. 4 East district, Slope district, and the West Incline district. No. 4 East turns off the Main tunnel at the "Cog" and is in a distance of one mile and a quarter. The output from this district is concentrated to the motor-road by self-acting inclines at various points along the level, and then gathered by a 13-ton Baldwin-Westinghouse electric motor. Longwall and pillar-and-stall methods of working the coal are used in the various sections of this district owing to the fluctuating conditions of the seam, varying from 3 feet in some sections to 10 feet in others.

Slope District.

A large amount of recovery-work has been done during the year, and some excellent coal has been taken out from the old abandoned workings of this slope. The old No. 3 East and West levels were opened up and the ventilation improved in this district.

The West Incline District.

This incline was developed during the year by driving a pair of inclines through the pillars paralleling the old No. 2 slope and intersecting the old Nos. 2 and 3 East and West levels, where some good hard coal of excellent quality has been recovered.

Opening-up work is being continued with very promising results in this part of the mine. Safety-lamps of the Wolf type and the Edison storage-battery electric lamps are used in this mine, and all blasting is done with permitted explosives fired by electric battery.

This mine is ventilated by a Murphy fan of 40,000 cubic feet capacity, against a 1.9-inch water-gauge, and is driven by a 25-horse-power type D.L.C. General Electric motor.

When I made my last inspection in this mine I measured 34,850 cubic feet of air a minute passing into the mine, divided into three splits.

In the West side split there was 11,500 cubic feet of air a minute passing for the use of eighteen men and three mules, or an average of 425 cubic feet of air a minute for each unit employed.

In the East side split there was 12,000 cubic feet of air a minute passing for the use of twenty men and three mules, or an average of 413 cubic feet of air a minute for each unit employed.

In No. 4 East split there was 10,850 cubic feet of air a minute passing for the use of thirty-two men and six mules, or an average of 217 cubic feet of air a minute for each unit employed.

I found no explosive gas in No. 2 mine. Timbering and roadways were in good condition and the mine fairly free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: West side split showing 0.4 per cent. methane in 12,840 cubic feet of air a minute; East side split showing 0.3 per cent. methane in 13,000 cubic feet of air a minute; No. 4 East split showing 0.2 per cent. methane in 12,000 cubic feet of air a minute; main return showing 0.4 per cent. methane in 40,000 cubic feet of air a minute.

No. 3 Mine, Extension.

Thomas Strang, Overman; Daniel Campbell, David Davidson, James P. Nimmo, Jr., James Nelson, Patrick Malone, and George Smith, Firebosses.

Development-work in this mine during the year has been continued principally in No. 4 West level and in the overlap section of McCoy's incline. No. 4 West level has been driven through the old workings that have been abandoned for several years. Some pillar coal is being opened up and extracted. Practically the whole of the mine is employed in pillar-extraction, with the exception of a small section of solid work off McCoy's incline.

Safety-lamps of the Wolf type and the Edison electric lamp are used throughout the mine; all blasting is done with permitted explosives fired by electric battery. This mine is ventilated by Guibal fan with a capacity of 65,000 cubic feet of air a minute, against a 1.7-inch water-gauge.

When I made my last inspection of this mine I measured 23,000 cubic feet of air a minute passing into the mine, divided into two splits.

In No. 1 split there was 13,000 cubic feet of air a minute passing for the use of forty-two men and seven mules, or an average of 206 cubic feet of air a minute for each unit employed.

In No. 2 split there was 10,000 cubic feet of air a minute passing for the use of thirty-two men and five mules, or an average of 212 cubic feet of air a minute for each unit employed.

No explosive gas found. Timbering and roadways were in good condition and the mine fairly free from coal-dust.

Tests made with the Burrell gas-detector in this mine were as follows: Return from No. 1 split showing 0.3 per cent. methane in 14,300 cubic feet of air a minute; return from No. 2 split showing 0.2 per cent. methane in 11,350 cubic feet of air a minute; main return showing 0.4 per cent. methane in 27,000 cubic feet of air a minute.

The following are the official returns from the Extension Collieries for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	109,371			
" export to United States	63,510			
" " other countries				
Total sales		172,881		
Used in making coke	233			
Used under colliery boilers, etc.	12,995			
Lost in washing	40,798			
Total for colliery use		54,026		
		226,907		
Stocks on hand first of year	3,616			
" last of year	2,423			
Difference taken from stock during year		1,193		
Output of collieries for year		225,714		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	25		18		43	
Whites—Miners	207				207	
Miners' helpers	23				23	
Labourers	23		29		52	
Mechanics and skilled labour	99		36		135	
Boys			19		19	
Japanese						
Chinese	5		55		60	
Indians						
Totals	382		157		539	

Name of seams or pits—Wellington, Extension.

Description of seams, tunnels, levels, shafts, etc., and number of same—Nos. 1, 2, and 3 mines connected by one main tunnel.

No. 5 MINE, SOUTH WELLINGTON.

Thomas A. Spruston, Manager; David Martin, Overman; Robert Ewing, Ernest H. Devlin, James E. Parrott, Joseph Lane, and Adam Watson, Firebosses.

This mine is situated at South Wellington, about five miles south of Nanaimo, alongside of the Esquimalt & Nanaimo Railway. It is operating in the Douglas seam, adjacent to the Old Alexandria mine.

The Main slope is down a distance of 3,000 feet, being driven 14 x 8 feet in the clear, and timbered with heavy sets, 4-foot centres. The coal is well adapted for steam purposes and varies from 2 to 16 feet in thickness. It is worked on the pillar-and-stall plan. Levels are turned off to the north and south of this slope, in which some met with barren and disturbed ground.

Diagonal slopes have been driven from the Nos. 3 North and 3 South to develop the territory expeditiously to the north and south of the Main slope, and from these diagonal slopes levels have been turned off to the right and left.

The ventilation is produced in this mine by an 8-foot Stine fan, belt-driven by a 50-horse-power type 3 Westinghouse motor, with a capacity of 90,000 cubic feet of air a minute.

Safety-lamps of the Wolf type and the Edison storage-battery electric lamp are used exclusively in this mine, and all blasting is done with permitted explosives fired by electric battery.

During the year a new Goldie & Bullock return-tubular boiler has been installed, making a battery of three of this type of boilers of 108.8-horse-power capacity each. Fuel is supplied from the fine screenings conveyed by a scraper conveyor direct from the shaker screens to the boiler-house. A marked feature of this plant is the compatible arrangements of tipple, power-house, mechanical shops, pumping plant, and office in close conjunction with the mine and railway.

When I made my last inspection of this mine I measured 70,000 cubic feet of air a minute passing into the mine, divided into two splits.

In the North side split there was 31,500 cubic feet of air a minute passing for the use of thirty-five men and three horses, or an average of 715 cubic feet of air a minute for each unit employed.

In the South side split there was 25,000 cubic feet of air a minute passing for the use of twenty-five men and one horse, or an average of 893 cubic feet of air a minute for each unit employed.

No explosive gas found in this mine. Timbering and roadways were in good condition and the mine free from coal-dust.

Tests made with the Burrell gas-detector were as follows: North side split showing 0.2 per cent. methane in 32,400 cubic feet of air a minute; South side split showing 0.1 per cent. methane in 27,000 cubic feet of air a minute; main return showing 0.2 per cent. methane in 72,600 cubic feet of air a minute.

The following are the official returns from the No. 5 South Wellington Colliery for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	60,087			
" export to United States				
" " other countries				
Total sales		60,087		
Used under colliery boilers, etc.	3,400			
Lost in washing	22,021			
Total for colliery use		25,421		
Stocks on hand first of year				
" last of year				
Difference taken from stock during year				
Output of colliery for year		85,508		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	6		1		7	
Whites—Miners	99				99	
Miners' helpers						
Labourers	7		18		25	
Mechanics and skilled labour	31		8		39	
Boys			8		8	
Japanese						
Chinese			21		21	
Indians						
Totals	143		56		199	

Name of seams or pits—Wellington.

Description of seams, tunnels, levels, shafts, etc., and number of same—Slope located just south of Old Alexandria mine.

Granby Consolidated Mining, Smelting, and Power Co. Colliery at Cassidy.

Officers.	*Address.*
W. L. Nichols, President or Chairman,	52 Broadway, New York.
J. T. Crabbs, Vice-President or Vice-Chairman,	52 Broadway, New York.
F. M. Sylvester, Vice-President and Managing Director,	813 Birks Bldg., Vancouver.
W. P. Earle, Secretary,	52 Wall Street, New York.
G. W. Wooster, Treasurer,	813 Birks Bldg., Vancouver.
R. R. Wilson, Superintendent,	Cassidy, B.C.

GRANBY No. 1 COLLIERY.

R. R. Wilson, Manager; Joseph Thompson, Overman; James Touhey, Jonathan Henney, John Bennett, Firebosses; John C. Hughes, James Webster, Alexander Orr, and Thomas Bullen, Shotlighters.

This mine is situated at Cassidy, B.C., and is being opened up in the Douglas seam, which averages 10 feet in thickness. It was acquired mainly to secure a supply of coke for the copper-smelter at Anyox. The area set apart at this colliery for a residence district comprises about 80 acres of bench land overlooking the Nanaimo river to the north and Haslem creek to the south, and sheltered by forested ridge to east and west, which is being preserved as a park.

The townsite was carefully planned to present a pleasing appearance. The streets are boulevarded and the houses surrounded by fresh green lawns and flower-gardens. Shade-trees have been planted along the boulevards on each street. The town is furnished with a modern sewage-disposal system and also with up-to-date waterworks system.

This colliery is provided with one of the finest athletic parks in the country. There is a baseball diamond, football ground, tennis-courts, bowling-green, and quarter-mile track. The athletic field is so large that a baseball and football game can be played at the same time without clashing, and the entire field is as level as a billiard-table. The hillside back of the athletic field forms a natural grandstand, and the company has reserved this as well as the timber on the other side of the town as a natural park.

A striking feature of the company's plans in laying down ideal conditions under which the men shall work is the programme of entertainment and physical and mental relaxation provided.

A temporary recreation-hall has been provided with gymnasium, dance-hall, library, reading-room, billiard and pool room, wrestling, boxing, and every other means of amusement and recreation which is possible to give the men.

The houses are neat and commodious, the architecture varies, and each house is equipped with every modern convenience. The streets are boulevarded, lined with shade-trees, and lighted with electric lights.

ROOMING-HOUSE.

The rooming-house for the accommodation of single employees is a gunite structure built in the form of a double L. It contains about eighty rooms, all of which open to the verandah or balcony. The rooms are steam-heated, electric-lighted, and each room is provided with running hot and cold water. The floor is a patent material, "Raccolith," and the rooms can be washed out with a hose when necessary. The company supplies the furniture and bedding as a precaution to ensure cleanliness and comfort of employees.

MESS-HOUSE.

The mess-house or dining-room is a gunite structure and is equipped with every modern convenience. The men enter the building through a lobby equipped with wash-basins and running hot and cold water, so that they can enjoy a refreshing wash, hang up their hats, and then proceed through a pretty vine-covered pergola to the dining-hall. At the entrance to the dining-room a drinking-fountain is provided where a stream of clear cold water is constantly available. The dining-hall is bright and comfortable, cool in summer and steam-heated in winter; each table accommodates six men. The kitchen is equipped with every labour-saving and modern device—electric dish-washing machine, vegetable-paring machine, tables heated by steam-coils to keep dishes hot, large bake-oven, and refrigeration plant.

THE CHANGE-HOUSE.

The change-house is in charge of Mr. Bond, an old experienced "first-aid man." Here the miners turn in their working-clothes if they are wet and have them placed in the drying-room by the attendant, so that they will be perfectly dry and comfortable when ready to go to work in the morning. The change-house is equipped with steel lockers which are heated with steam-coils from underneath, shower-baths, and large lavatory, including every convenience.

HOSPITAL AND FIRST AID.

A modern temporary hospital and first-aid station has been established in one of the larger houses until the permanent hospital can be constructed. This hospital is in charge of a skilled matron and trained nurse.

MINE BUILDINGS.

Between the change-house and the manway portal are the powder-house, in which the stock of explosives is limited to one day's supply, the large magazine being on the opposite side of the hill from the town, the time-keeper's office, lamp-house, and mine-rescue station. The lamp-house is equipped with 300 Edison storage-battery electric lamps and recharging apparatus. The rescue-station is equipped with four sets of Gibbs apparatus, lung-motor, smoke-chamber, etc., and a large lecture-room for holding first-aid or mining classes. The above buildings are all steam-heated with exhaust steam from the power-house.

TIPPLE AND WASHERY.

The tipple is equipped with Fairbanks scale, rotary dump, Marcus screen, and loading-boom. The railroad-cars are handled with Fairmont car-retarders. The track-scale is a Fairbanks standard, all steel and concrete. The rock-cars are handled with special Wilson rotary dump.

The washery is equipped with two 2-compartment jigs having a capacity of 40 tons an hour each. The tipple and washery were designed by Roberts & Schafer, of Chicago. The washery is equipped with sludge-recovery and uses the same water over and over again. The washed slack is used in the new by-product plant at Anyox in making coke for the copper-smelter, and the lump, nut, and some pea coal sold. The bone coal is burned under the colliery boilers.

POWER-HOUSE.

The boiler plant at present consists of two Badenhauser water-tube boilers, 260-horse-power each, fired by mechanical stokers. The ashes are removed by washing and fluming to the dump. The feed-water is heated with a Webster feed-water heater and forced draught is used. The brick stack is 8 feet in diameter and 125 feet high. The boilers and steam-pipes are all insulated with asbestos and magnesia to prevent loss of heat. Venturi meters are used to check quantity of water at pump-station and at the boilers. The compressor is a Rand cross-compound condensing, capacity 2,000 cubic feet of air a minute. The air is used for running the underground drills, pumps, and hoists.

Electric power is supplied by an Allis-Chalmers 450-kw. generator (2,300 volts, 3-phase, 60 cycles, 360 r.p.m.), also an auxiliary unit, 250 kw. (2,300 volts, 3-phase, 60 cycles, 450 r.p.m.), both direct-connected to vertical high-speed engines (Goldie & McCollough). The remainder of the electric equipment is of Westinghouse make. The power-house is equipped with the Bowser oil-handling system. A Worthington fire-pump, capacity 1,000 gallons a minute, size 18 x 10 x 12 inches, is ever in readiness for an emergency.

The entire plant is equipped with an exhaust steam-heating system, the condensation being returned to the boilers.

CARPENTER, MACHINE, AND BLACKSMITH SHOPS.

The shops are all thoroughly equipped and well lighted and will be connected with the mine-tracks. The carpenter-shop is fitted with rip-saw, band-saw, planer, boring and mortising machine.

The machine-shop is equipped with a large lathe, small lathe, planer and shaper, pipe-threading machine, drill-press, emery-wheel, etc. The shafting is well guarded. The master mechanic's office adjoins the machine-shop.

The blacksmith-shop is fitted with two forges, steam-hammer, and swing-crane. Adjoining the blacksmith-shop is a special tool-house where miners' picks are kept after sharpening. All scrap-iron is sorted and stored in pockets provided for the purpose.

Waterworks System.

The pump-station is equipped with two Morris centrifugal pumps, each having a capacity of 300 gallons a minute. These pumps elevate the water to the two 50,000-gallon storage-tanks situated on top of the hill overlooking the town, whence it flows by gravity through the water-mains.

The pumps are driven by a 50-horse-power Westinghouse electric motor. A Venturi meter records the quantity of water leaving the station at all times. The Nanaimo river furnishes a plentiful supply of pure water for domestic and power purposes.

Telephone System.

The colliery is equipped with complete telephone system, which connects all surface offices, shops, and buildings with the underground workings.

The Mine.

The seam dips at about 18 degrees and the coal-seam varies in thickness from 5 to 20 feet, averaging about 10 feet. The roof and floor are of shale formation and subjected to rolls. The roof is fairly regular, most of the rolls occurring in the floor.

The mine is opened on the full dip of the seam, the Main slope having been driven about 2,500 feet. It is being driven 7 x 14 in the clear to allow for double track, and is timbered with 12- x 14-inch framed sets, spaced 4 feet from centre to centre. A separate manway is provided as a travelling-road, and employees are not allowed to use the Main slope haulage-road in passing to and from their working-places.

The mine is being worked on the pillar-and-stall system; four levels are turned off to the north and four levels to the south, with parallel counter-levels.

The mine is divided into relatively small panels as a precaution against mine fires, and large pillars are left along all main haulage-roads and permanent airways, the idea being to extract a maximum amount of coal at least cost rather than to take out cheap coal for a few years to the final detriment of the mine.

Mining is planned so as to deliver the coal from the faces to the main haulage system by gravity as far as possible. Storage-battery locomotives are used on the levels underground; no horses or mules are used. The drainage system has been carefully planned, so that surface water entering the mine from the gravel will drain by gravity, and water from the workings below the drainage will be pumped to a central sump.

The mine is ventilated by a Sirocco fan with a capacity of 150,000 cubic feet of air a minute. The mine is provided with a double intake and return airway throughout the mine, and the workings are planned so that the air can be taken to the face with a minimum loss. The fan-house is a concrete structure, and also houses the telephone exchange and motor-generator set for charging storage-battery locomotives. The fan is driven by a 150-horse-power Westinghouse electric motor. The main hoist is a Vulcan 18- x 36-inch double-drum, second-motion hoist.

The mine-cars are wooden cars having a capacity of 1¾ tons of coal. The track-gauge is 36 inches. Hadfield manganese steel, self-oiling wheels, 18-inch diameter and 3-inch tread, are used. The cars are built in the company shops at the mine and have no end doors.

When I made my last inspection of this mine in December I measured 100,000 cubic feet of air a minute passing into the mine, divided into three splits.

In No. 1 North split there was 11,000 cubic feet of air a minute passing for the use of four men, or an average of 2,750 cubic feet of air a minute for each unit employed.

In No. 2 North split there was 30,500 cubic feet of air a minute passing for the use of thirty-six men, or an average of 847 cubic feet of air a minute for each unit employed.

In the South side split there was 42,000 cubic feet of air a minute passing for the use of twenty-two men, or an average of 1,909 cubic feet of air a minute for each unit employed.

I found no explosive gas in this mine. Timbering and roadways were in good condition and the mine free from coal-dust.

The following are the official returns from the Granby Colliery for year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	22,187		19,206	
" export to United States	2,688			
" " other countries				
Total sales		24,875		19,206
Used in making coke, Anyox	31,623			
Used under colliery boilers, etc.	8,565			
Total for colliery use		40,188		
Stocks on hand first of year	3,763			
" last of year	11,585			
Difference added to stock during year		7,822		
Output of colliery for year		72,885		19,206

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	5	6.67	7	7.40	12	7.09
Whites—Miners	82	9.00			82	9.00
Miners' helpers						
Labourers	12	5.25	28	4.65	40	4.83
Mechanics and skilled labour	4	5.90	11	6.35	15	6.23
Boys			4	3.00	4	3.00
Japanese						
Chinese						
Indians						
Totals	103	8.32	50	5.27	153	7.32

Name of seams or pits—Douglas.

Description of seams, tunnels, levels, shafts, etc., and number of same—Dip, 18 degrees; average thickness, 8 feet; seam subject to rolls, floor and roof. Thickness varies in different parts of mine. Roof is shale; floor same.

Description and length of tramway, plant, etc.—Plant modern in every way. Sirocco fan, capacity 150,000 cubic feet a minute; Vulcan hoist, 18 x 36 inches, double-drum second-motion; tipple equipped with rotary pump, Marcus screen, loading-booms, and railway-cars handled by Fairmont car-retarders; washery equipped with two 2-compartment jigs, capacity 80 tons an hour, and sludge-recovery. Bone coal burned under the boilers. Edison storage-battery electric lamps used underground; no horses or mules used. Storage-battery locomotives for haulage underground. Boiler plant equipped with Badenhausen boilers fired by type E mechanical stokers; ashes are flumed to dump. The Main slope has been driven to a depth of approximately 2,500 feet; No. 1 North level, 1,570 feet to the Nanaimo river; No. 2 North, 1,365 feet; No. 3 North, 180 feet; No. 4 North, just started; No. 4 South, 90 feet; No. 3 South, 170 feet; No. 2 South, approximately 1,230 feet.

NORTHERN INSPECTION DISTRICT.

Report by Thos. J. Shenton, District Inspector.

Telkwa Collieries Co., Ltd.

Officers.	*Address.*
W. A. Woodland, President or Chairman,	Prince Rupert, B.C.
J. K. Ashman, Vice-President or Vice-Chairman,	Smithers, B.C.
T. McClymont, Secretary,	Prince Rupert, B.C.
John Gillespie, Superintendent,	Telkwa, B.C.

TELKWA COLLIERY.

Indications show improvement with respect to thickness and continuity. The thickness of the veins measure from 2 to 8 feet, and the working-faces are reached by Nos. 1 and 2 drifts, now measuring a distance of 75 and 90 feet respectively. A number of places have already been turned off, many of which have been again abandoned, due to trouble in wash-out or dislocation of the vein. The mine from a standpoint of timbering, ventilation, and general conditions is in fair keeping with the provisions of the "Coal-mines Regulation Act."

The following are the official returns from the Telkwa Colliery for the year ending December 31st, 1919:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	1,752			
" export to United States				
" " other countries				
Total sales		1,752		
Used in making coke				
Used under colliery boilers, etc.				
Total for colliery use				
Stocks on hand first of year				
" last of year				
Difference { added to / taken from } stock during year				
Output of colliery for year		1,752		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$				
Supervision and clerical assistance	1	7.00			1	
Whites—Miners	2	6.00			2	
Miners' helpers	2	5.50			2	
Labourers	1				1	
Mechanics and skilled labour						
Boys						
Japanese						
Chinese						
Indians						
Totals	6				6	

Name of seams or pits—Goat creek.
Description of seams, tunnels, levels, shafts, etc., and number of same—Two tunnels in side-hill.

NICOLA-PRINCETON INSPECTION DISTRICT.

REPORT BY ROBERT STRACHAN, INSPECTOR.

I have the honour to submit my annual report as Inspector of Coal-mines for the Nicola-Princeton Inspection District during the year ending December 31st, 1919.

The Middlesboro Collieries Company, Limited; Fleming Coal Company, Limited; Princeton Coal and Land Company; Coalmont Collieries, Limited; and the Merritt Collieries all operated during the year, and no active mining was carried out at either the Pacific Coast Collieries of British Columbia, Merritt; the United Empire, Princeton; or the Boundary Mining and Exploration Company, of Midway.

Work has been fairly steady in all the operating mines, with the exception of the Merritt Collieries, which was only working for some weeks.

The gross output for the district shows 149,042 long tons, being a decrease of 30,137 as compared with the previous year.

It is very pleasing to record that there have been no fatal accidents during the year; one serious and one slight. A cave of roof-rock which was being timbered caused the serious accident, and shows that greater care should be exercised in this work.

Samples of the mine-air have been taken during the year, and show that the percentages of methane in the air-currents in this district are fairly low.

Inspection on behalf of the workmen, as required by section 91, Rule 37, of the "Coal-mines Regulation Act," has been carried out regularly every month, so far as Nos. 7 and 8 mines, Middlesboro, and No. 3 mine of the Fleming Coal Company are concerned, but in the others no attempt has been made to comply with this rule. These other mines are small, making the cost of this inspection heavy, and, as suggested last year, it would be in the best interest of these if small mines could be grouped together for this purpose.

MINE FIRES.

Trouble from mine fires have been experienced in Middlesboro Colliery, Nos. 4 and 7 mines; No. 3 mine, Coal Hill, of the Fleming Coal Company; and in Princeton mine of the Princeton Coal and Land Company. With the exception of No. 7 mine, Middlesboro Colliery, these were old fires which have been burning for years sealed off, and either burned over the stoppings or had been presumed to be out, allowing the district to be reopened, but later developed activity.

I might mention here that the principal cause of fires in mines, which seem to be greatly on the increase, is lack of sufficient ventilation; old districts are abandoned improperly sealed off, sluggish air-currents travel through them, timber decay and decrepitation of the coal is caused by the crushing of pillars, all furnishing the most favourable conditions for spontaneous combustion. In very few cases is the sealing-off successful to the extent of extinguishing the fires; invariably within a few weeks or months of the reopening of the sealed off area the supposed extinguished fire is fanned into activity, and it is a distinct disappointment that greater care is not taken to prevent them.

The Edison electric mine safety-lamp is in general use for the workmen at Middlesboro, Princeton, and Coal Hill mines; all the others use the Wolf safety-lamp, except at Coalmont, where open lights are in use by the workmen.

Blasting is carried out at all the mines subject to the requirements as laid down in the "Coal-mines Regulation Act," and I have generally found the requirements very well complied with.

The explosives are those shown on the "Permitted List" as issued by the Hon. the Minister of Mines, and the quantities used during the year are as follows:—

Colliery.	Explosive.	Quantity.	Shots fired.	Per Shot.	Miss-fires.
		Lb.		Lb.	
Middlesboro	Monobel	16,280	24,550	0.7	11
"	Polar Ammonia	1,050			
Coalmont	Monobel	4,100	10,250	0.4	..
Coal Hill	Monobel No. 4	11,857	13,443	0.88	26
Princeton	Monobel	2,400	3,500	0.68	..
Totals		35,687	51,743	....	37

MINE-RESCUE WORK.

The standard in this work has been very well maintained at the larger collieries, but in the case of the smaller mines the condition, number of apparatus, and lack of trained workmen make the presence of apparatus a positive danger.

The excuse, and excuse it generally is, is that they will not require it, but the unfortunate aspect is that when apparatus is required the need comes quickly and is great. There is then no time to repair apparatus, get new parts, or train men, and the only remedy I can see is that stringent rules be laid down, requiring a minimum amount of apparatus in proportion to the workmen employed, with a minimum amount of training, which should be maintained at least every month.

The work of first aid to the injured has been well maintained during the year, classes being held in Merritt and Princeton, and I think a great deal of credit is due to those who take up this work and ungrudgingly give their services to reduce the amount of human suffering.

I wish to extend our very best thanks to the workmen and mine officials for their assistance in carrying out our duties during the year 1919, and confidently look forward for a continuation of the same during the year we are now entering upon, for it is only by co-operation on the part of every one that we can expect to keep the list of accidents where it has been during the past year, free from fatal accident, and try to reduce the non-fatal.

Middlesboro Collieries, Ltd.

Head Office—Vancouver, B.C.

Capital, $1,107,700.

Officers.	*Address.*
E. W. Hamber, President,	Vancouver, B.C.
G. S. Raphel, Vice-President,	Vancouver, B.C.
Thomas Sanderson, Managing Director and Secretary,	Vancouver, B.C.
Robert Fairfoull, Mine Manager,	Middlesboro, B.C.

Value of plant, $250,000.

MIDDLESBORO COLLIERY.

Robert Fairfoull, Manager.

This colliery is situated one mile from Merritt Station, on the Kettle Valley Railway, and consists of Nos. 2, 4, 4 East, and 7 mines, the last three of which were operated during the year 1919.

No. 4 Mine.

Alexander Ewart, Overman; William Hallinan, Geo. Hudson, Thos. Archibald, and A. D. Allan, Firebosses.

This mine, which is reached by a rock tunnel crossing the measures, cutting Nos. 4, 5, 6, 8, and 9 seams, operated on the Nos. 4, 6, 8, and 9 seams, all of which are connected through to the surface at the outcrop. The method of work is pillar and stall, pillars being left about 50 feet square, while the stalls are driven 10 feet wide.

All the seams lie at an angle of 20 degrees, dipping to the south, allowing of the use of chutes which carry the coal to the level, where it is loaded into cars and taken to the surface by horse first, then main and tail-rope haulage.

During the year the work has consisted of the extraction of pillars in No. 4 seam; in the others development. The coal is mined by hand and blasted where required, permitted explosives and electric detonators being used.

Ventilation is produced by a steam-driven fan of the Sheldon type, 8.5 feet in diameter, and constructed so that it can be reversed if required, and at my last inspection was producing 54,000 cubic feet of air a minute for the use of thirty-three men and two horses, running at a speed of 90 revolutions a minute, with a 0.5-inch water-gauge. Barometer, 28.5 inches; thermometer, 3° Fahr.

The general conditions with regard to ventilation during the year have been very good, and very seldom has explosive gas been reported, while the mine is free from coal-dust. The working-places and roadways have been kept in good condition, while a plentiful supply of timber was provided for the use of the workmen.

As I mentioned in my report last year, trouble had been experienced with an old gob-fire which had been sealed off; at the latter part of the present year this broke out again, and as there was very little coal to be recovered the No. 4 seam was abandoned. This contingency had been provided for by having strong concrete stoppings constructed, and it was only necessary to fill these in, which was rapidly accomplished with very little risk.

No. 4 East Mine.

James Fairfoull, Overman; Lewis Shearer, Fireboss.

This mine is situated a short distance to the east of the entrance to No. 4, and is also on the same seam. The Main slope has not been sunk during the year owing to the faulting of the seam, which has caused considerable trouble in this mine, resulting in most of the work

being of a prospecting nature. The pitch, method of work, and haulage arrangements are very similar to those described in the No. 4 mine.

The ventilation is produced by a small quick-running fan of the Sirocco type, 4 feet in diameter, and at the time of my last inspection was producing 40,000 cubic feet of air a minute for the use of eleven men and one horse, running at a speed of 375 revolutions a minute, with a 0.5-inch water-gauge. Barometer, 28.5 inches; thermometer, 3° Fahr. The mine is very well timbered and plenty of timber is provided convenient for the use of the workmen.

Explosive gas has been rarely found in this mine, and it is naturally damp and free from dangerous coal-dust.

No. 7 Mine.

Jno. McDonald, Overman; Thos. Rowbottom, James McGrath, and Howell John, Firebosses.

This mine is situated in Coal gully, about 400 feet higher than the entrance to No. 4 mine and the tipple. The seam, which is generally considered to be the same as No. 4, is about 15 feet thick, of which only the upper 8 feet has been worked in the preliminary operation of development. The method of work, inclination, and haulage are very similar to those described in No. 4 mine, but the pillars have been increased with the depth attained.

As mentioned in the last year's report, the work was started to retreat, extracting the pillars, and this has been continued during the present year.

The ventilation, which is produced by a small fan of the Guibal type, driven by a compressed-air engine, has been very good all the times I have examined the mine, and no signs of explosive gas have been found.

At the last inspection I found 40,000 cubic feet of air a minute for the use of twenty-two men and one horse. The speed of the fan was 200 revolutions a minute, with a 0.3-inch water-gauge. Barometer, 28 inches; thermometer, 3° Fahr.

All the working-places and roadways are very well timbered and a plentiful supply of timber was provided convenient for the use of the workmen. The mine is naturally damp and free from dangerous accumulations of coal-dust.

The Nos. 8 and 9 mines mentioned last year are now connected to No. 4, are ventilated from No. 4 mine, and the coal is taken out to the tipple through this mine.

Blasting is carried out at all the mines under the supervision of competent persons as provided for in the "Coal-mines Regulation Act." All the lamps in use are the Edison electric mine safety or of the Wolf type, the first by the workmen, the second by the officials for inspection purposes.

All the coal is brought to a common tipple in cars with a capacity of 1.75 tons, where it is unloaded by a Phillips crossover dump, a switchback and car-haul taking the empty cars back, so that they can be arranged in trips for whatever place required. The coal is screened, sized, and picked before it goes into the coal-pockets, from which it is taken as required, a box-car loader being used for loading cars of that kind.

The main power plant is situated near the tipple, consisting of four return-tubular boilers with a capacity of 640 horse-power, a Canadian Rand low-pressure air-compressor with a capacity of 2,000 cubic feet of free air a minute providing power for the underground hoists, pumps, etc. Well-equipped machine, car-repair, and carpenter shops are maintained, besides commodious offices and dwellings for the workmen.

Copies of the "Coal-mines Regulation Act," special rules, systematic timbering orders, and plans of the mine are all kept posted at the colliery.

A very well-equipped mine-rescue training is also maintained by the Middlesboro Collieries, where, in addition to their own mine-rescue apparatus, that of the Department of Mines is kept in a high state of efficiency. A great deal of credit is due this company and the instructor, Mr. Stone, for the interest taken in this work, which is reflected in the number of men trained not only for the use of the Middlesboro Colliery, but for the district.

The following are the official returns of the Middlesboro Colliery for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	73,180			
" export to United States				
" " other countries				
Total sales		73,180		
Used in making coke				
Used under colliery boilers, etc.	4,490			
Total for colliery use		4,490		
		77,670		
Stocks on hand first of year	156			
" last of year	36			
Difference taken from stock during year		120		
Output of colliery for year		77,550		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	12		5	6.00	17	
Whites—Miners	55	7.00			55	
Miners' helpers	14	4.25			14	
Labourers	36	4.50	20	4.75	56	
Mechanics and skilled labour			14	5.25	14	
Boys			8	2.25	8	
Japanese						
Chinese						
Indians						
Totals	117		47		164	

Name of seams or pits—Nos. 4, 6, and 8. The operating mines of the Middlesboro Collieries, Nos. 7, 4, and 4 East, are situated about one mile from the city of Merritt, a branch of the Kettle Valley Railway providing communication with the Canadian Pacific Railway and the Boundary country. Mining operations at present are confined to the Lower or Coal Gully series.

Description of seams, tunnels, levels, shafts, etc., and number of same—No. 4 mine: This mine is including Nos. 5, 8, and 6 seams and is reached by a Main level driven in No. 5 seam, and then by a crosscut tunnel passing through Nos. 4 and 8 seams to No. 6 seam. Mining is now confined to the Nos. 6 and 8 seams. These seams are about 6 feet thick, pitching south at an angle of about 25 degrees. The method of work is pillar and stall; haulage by a compressed-air hoist. The ventilation is provided by a Sheldon fan 8½ feet in diameter and driven by an Ideal steam-engine. The fan is built so that it can be used either as an exhaust or positive type and is capable of producing 90,000 feet of air, with a 4-inch gauge. No. 4 East: The entrance to No. 4 East is situated about 800 feet to the east of No. 4 mine,

operations being carried out in the No. 4 seam, in which is driven the Main slope. Development-work in this mine has been restricted to the driving of a main level and counter from a point near the bottom of the slope. Ventilation is provided by a small quick running fan driven by a Sheldon steam-engine. Haulage on the Main slope is by a steam-engine; underground by compressed-air hoists, the cars being brought to the landing by mules. No. 7 mine: The entrance to No. 7 mine is situated in Coal gully at an elevation of 300 feet above the tipple, and is operating in the No. 4 seam. Mining operations in this mine are now confined to the extraction of pillars. Haulage is by compressed-air hoists, the cars being brought to the sidings by mules. After reaching the surface the coal is lowered to the tipple by a gravity-plane 1,000 feet long and pitching 30 degrees. Ventilation is produced by a small fan of the Guibal type capable of producing 50,000 cubic feet of air a minute, with a water-gauge of 1 inch.

Description and length of tramway, plant, etc.—All the coal from the various mines is brought to a common tipple in cars having a capacity of 1.5 tons. They are dumped by a Phillips crossover dump, a switchback and car-haul bringing back the empties for distribution to the mines. A Christie car-loader is used for loading box cars. The main power plant is situated near the tipple and consists of four return-tubular boilers, each 150 horse-power; a Canadian Rand cross-compound compressor with a capacity of 2,000 cubic feet of free air a minute; a 27½-kw. generator for lighting purposes; and the necessary feed-pumps for the boilers, fire-protection, and household purposes. There is also a well-equipped machine-shop, carpenter and car-repairing shops, also a mine-rescue station in which is stored with our own rescue apparatus the Government apparatus.

The Fleming Coal Company, Ltd.

(FORMERLY THE INLAND COAL AND COKE COMPANY, LTD.)

Head Office—Vancouver, B.C.

Officers.	*Address.*
Joseph Martin, President,	315 Credit Foncier Bldg., Vancouver, B.C.
Joseph Graham, Managing Director,	Merritt, B.C.
A. L. Welch, Secretary-Treasurer,	404 Drake Street, Vancouver, B.C.
A. E. Smith, Manager,	Merritt, B.C.

COAL CREEK COLLIERY.

This colliery is situated south-west of the Middlesboro and at an elevation of 500 feet above it.

No. 3 MINE.

A. E. Smith, Manager; John T. Brown, Overman; John Smith, Geo. Maxwell, and George Walker, Firebosses.

This colliery, like the Middlesboro, is situated close to the town of Merritt and is served by a branch of the Kettle Valley Railway. The mine is sunk on the seam at a point about 500 feet higher up the hill than the Middlesboro Colliery and on the No. 3 seam, which is the same as that worked in No. 7, Middlesboro.

A cross-cut tunnel from the No. 3 seam cuts the No. 5 seam, and both of these have been working during the year. The No. 3 seam is about 12 feet thick, while the No. 5 is 5.5 feet; both are worked by the pillar-and-stall method; the pitch varies from 20 to 30 degrees and allows of the coal being brought from the faces to the levels by chutes. During the past year, with the exception of some development-work, the chief operation consisted of the extraction of pillars.

Unfortunately, at the latter part of the year the fire which had caused a large part of this mine to be sealed off for some years revived, and it was found necessary to abandon all the development-work and seal this district up again.

Conditions with respect to ventilation and gas have been fairly good during the year, and at the last inspection I found 7,500 cubic feet of air circulating for the use of fourteen men and two horses in the No. 3 seam. In the No. 5 seam I found 12,000 cubic feet of air a minute for sixteen men. Speed of fan, 360 revolutions a minute; water-gauge, 0.5 inch. Barometer, 27.6 inches; thermometer, 0° Fahr.

All the working-places were very well timbered and plenty of timber was provided convenient for the use of the workmen. The No. 3 seam is fairly well free from coal-dust, and in the inby portions of No. 5 flue-dust is used to keep this down on the roadways and water where blasting is carried out.

The coal is all mined by hand; the explosive used is Monobel with electric detonators under the supervision of certificated officials. The haulage from the foot of the chutes is by horse to the Main slope, where they are hoisted by steam to the surface. From the top of the slope the cars are lowered in trips to the top of a gravity-plane, which lowers them to the tipple. This gravity-tram consists of a 3-rail track with passing in the middle, 1,800 feet long, handling six-car trips, each car having a capacity of 1 ton, using a 1-inch steel rope on a Stine wheel.

The lamps used in the mine are either Edison electric safety-lamp or the Wolf safety-lamp.

The power plant consists of two Leonard-type boilers with a joint capacity of 80 horse-power, furnishing steam for the hoists, pumps, fan-engine, and lighting plant. An auxiliary plant at the tipple consists of one small 25-horse-power boiler which furnishes steam for the small hoist on the tipple and the pump which delivers the water to the mine. Another small boiler is situated near the river to furnish the steam for the pump, which delivers the water to the tank at the tipple. The other surface equipment consists of machine, carpenter, car-repair shop, and office buildings.

The following are the official returns of the Fleming Coal Company for the year ending December 31st, 1919:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	37,260			
" export to United States				
" " other countries				
Total sales		37,260		
Used in making coke				
" under colliery boilers, etc.	1,890			
Total for colliery use		1,890		
		39,150		
Stocks on hand first of year	140			
" last of year	100			
Difference taken from stock during year		40		
Output of colliery for year	39,110	39,110		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		
Supervision and clerical assistance	5	7.00	2	5.00	7	
Whites—Miners	35	7.50			35	
Miners' helpers						
Labourers	12	4.50	12	4.25	24	
Mechanics and skilled labour			7	5.00	7	
Boys						
Japanese						
Chinese						
Indians						
Totals	52		21		73	

Name of seams or pits—Coal Hill Colliery, Nos. 3 and 5 seams.

Description of seams, tunnels, levels, shafts, etc., and number of same—Five seams have been discovered on this property, but, as the practice for some years past, only two, the No. 3 and No. 5 seams, were operated. The No. 3 seam, which is 10 feet thick, furnished 60 per cent. of the output, mainly pillar coal. The development-work during the year was confined to reopening No. 4 West level, which had been closed several years ago owing to a gob-fire. Retimbering and realigning this level was quite an arduous job, but made available a large body of pillar coal, and it was decided to drive through the West fault, some 80 feet, where a fine body of coal from 9 to 14 feet thick was opened up for several thousand feet in entries and rooms. A threat of the gob-fire to develop forced the closing of this section, which will be reopened from another point. No. 5 seam was developed on the 600 West level for a considerable distance, maintaining its size and quality.

Description and length of tramway, plant, etc.—The plant, which has been well maintained, consists mainly of two Eclipse Leonard boilers, 40 horse-power; Aleos fan, 50,000 feet capacity, driven by a 60-horse-power engine; one 60-horse-power Ottuma hoisting-engine; tramway 1,800 feet long, 3-rail system, with Stine wheel. Tipple, bunkers, and scales are connected with a railway spur one mile long to Canadian Pacific Railway and Kettle Valley Railway tracks.

Princeton Coal and Land Company, Ltd.

Head Office—15 Great St. Helens, London, E.C.

Capital, $1,000,000.

Officers.	*Address.*
A. St. George Hamersley, Chairman,	London, Eng.
E. S. Neave, Secretary,	London, Eng.
Ernest Waterman, General Manager,	Princeton, B.C.
Francis Glover, Manager,	Princeton, B.C.

Value of plant, $77,000.

PRINCETON COLLIERY.

Francis Glover, Manager; William James, Overman; Robert Gourlay, Ben. J. Barlow, and Hugh Gillispie, Firebosses.

This colliery is situated on the right-hand bank of the Similkameen river, near the town of Princeton, and consists of one slope for haulage, with a vertical shaft for ventilation purposes. The slope, dipping through a gravel covering at an angle of 14 degrees, reaches the coal in about 200 feet.

The coal-seam averages 20 feet thick, with an inclination of about 12 degrees to the south. Work is confined to the upper 10 feet of this, and the method of working is pillar and stall; pillars 50 feet square and stalls 12 feet wide.

The mining of the coal during the development stage of the mine was done by machines of the post-puncher type, driven by compressed air, but when retreating the coal can be easily extracted without machines.

Ventilation is produced by a small fan of the Guibal type, driven by a steam-engine, and at my last inspection was producing 27,000 cubic feet of air a minute for the use of twenty-two men, running at a speed of 200 revolutions a minute, with a 1-inch water gauge.

During the year the mine has been fairly free from explosive gas and all the working-places and roadways have been fairly well timbered. Plenty of timber was provided for the use of the workmen and the condition of the mine with respect to coal-dust was fair.

Unfortunately, in the earlier stages of mining, very little attention was paid to keeping the mine free from accumulations of slack coal and debris, with the result that fires have been a fruitful source of trouble for some years past.

Lately an attempt to mine the coal on a panel system has given more satisfactory results, but in the older workings, owing to the light cover and open texture of the coal, it has been found difficult to keep these under control, much less to extinguish them.

The explosives used for blasting are those permitted under the order issued for this purpose, and certificated officials superintend the use of the same.

The surface equipment consists of a tipple with a link-belt screening plant having a capacity of about 400 tons a day. The coal is loaded into cars with a capacity of 1.5 tons and is hauled up the Main slope by a 50-horse-power hoist, steam-driven, to the tipple, where a Robinson self-acting rotary dump unloads them into the picking-tables, where the coal is sized for market purposes. The tipple machinery is driven by a 50-horse-power steam engine, while the loader and conveyor attached is driven by a separate engine.

The power plant consists of three boilers, with a combined capacity of 200 horse-power; two Canadian Rand low-pressure air-compressors, which furnish power for the mining-machines, pumps, and hoists in the mine; and a 60-kw. 3-phase, alternating-current dynamo furnishes light for the mines and the town of Princeton.

A well-equipped machine, carpenter, and car-repair shop is maintained, and a new wash-house was erected during the year to replace that destroyed by fire. Unfortunately, during the past summer, a fire destroyed the lamp-room, mine offices, and warehouse, and so far these have not been replaced.

With the destruction of the lamp-room, all the lamps, including the miners' electric head-lights, which were of the Wico type, were destroyed, and the Edison safety electric lamp has replaced them, while the inspection is made with the Wolf safety-lamp.

Copies of the "Coal-mines Regulation Act," special rules, "Timbering orders," and plans of the mine are posted at the mine entrance.

The following are the official returns of the Princeton Coal and Land Company for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	14,193			
" export to United States	1,817			
" " other countries				
Total sales		16,010		
Used in making coke				
Used under colliery boilers, etc.	5,062			
Loss and waste	1,141			
Total for colliery use		6,203		
		22,213		
Stocks on hand first of year	85			
" last of year	65			
Difference taken from stock during year		20		
Output of colliery for year		22,193		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	4		5	5.50	9	
Whites—Miners	14	5.75-10.00			14	5.75-10.00
Miners' helpers	10	4.75			10	4.75
General underground men	16	4.75-5.00	7	4.00	23	4.00-5.00
Mechanics and skilled labour			7	4.80-5.00	7	4.80-5.00
Boys			4	2.00-3.00	4	2.00-3.00
Japanese						
Chinese						
Indians						
Totals	44		23		67	

Name of seams or pits—As last year, with the addition of No. 3 mine, which is in the prospecting stage. We have driven a tunnel, practically on the crop, for a distance of 250 feet. This is an exceptionally clean coal, about 3 feet 9 inches thickness of seam.

Description of seams, tunnels, levels, shafts, etc., and number of same—Same as previous year.

Description and length of tramway, plant, etc.—Same as previous year.

Coalmont Collieries, Limited.

Head Office—Vancouver, B.C.

Capital, $3,000,000.

Officers.	*Address.*
W. J. Blake-Wilson, President,	Vancouver, B.C.
W. L. Parrish, Vice-President,	Winnipeg, Man.
A. H. Douglas, Secretary-Treasurer,	Vancouver, B.C.
Donald McLean, Manager,	Coalmont, B.C.

COALMONT COLLIERY.

Donald McLean, Manager and Overman; Thos. Bysouth, Fireboss.

This colliery is situated about twelve miles south of Princeton and five miles from the townsite of Coalmont, on the Kettle Valley Railway. The mine is driven in on the north bank of Granite creek and has been operating during the entire year. The output has averaged about 50 tons a day and is hauled by auto-trucks in summer and sleighs in winter to the Kettle Valley Railway siding near the town of Coalmont, a distance of about five miles, and this at present necessarily limits the production to the capacity of the haulage.

The No. 2 tunnel has now reached a distance of 3,600 feet from the portal, blocking out a considerable amount of coal, and is still being driven ahead in a very good seam of coal averaging 10 feet thick, with an inclination of 18 degrees, dipping to the south. A 25-horse-power boiler supplies steam for the fan, and so far no mechanical haulage has been required, all the workings being above water-level.

A cook-house, bunk-house, and about eight small cottages are maintained at the mine, while the principal workshops, offices, and living accommodation are situated at Coalmont.

During my inspections in 1919 I have found no trace of explosive gas and the mine is very well timbered throughout. Plenty of timber is provided convenient for the use of the workmen, and due to the nature of the coal very little coal-dust is created.

A 36-inch Comstock blower-fan, driven by a 8- x 10-inch steam-engine, capable of producing 16,000 cubic feet of air a minute, is maintained for ventilation purposes, but during the past summer natural ventilation has produced 4,500 cubic feet of air a minute, sufficient for the requirements of seven men and one horse.

This is the only mine in this district using open lights, generally carbide-lamps, the examination being made with a safety-lamp of the Wolf type, and, as already mentioned, no trace of methane has been found.

The coal is of a fairly firm nature and is blasted with Monobel with electric detonators under the supervision of certificated shotlighters.

MINE-RESCUE APPARATUS.

Two apparatus of the old negative 2-hour type are maintained at this colliery, but there are no persons holding certificates for this work within eighteen miles. The condition of the apparatus is anything but satisfactory, and in the event of an accident would be practically useless, if not a positive danger.

Copies of the "Coal-mines Regulation Act," special rules, and plans of the mine are kept posted at the mine entrance.

The following are the official returns of the Coalmont Collieries for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR THE YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	7,091			
" export to United States	2,898			
" " other countries				
Total sales		9,989		
Used in making coke				
Used under colliery boilers, etc.	200			
Total for colliery use		200		
Stocks on hand first of year	1,000			
" last of year	1,000			
Difference added to stock during year				
Output of collieries for year		10,189		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
		$		$		$
Supervision and clerical assistance	2	6.00			2	6.00
Whites—Miners	10	8.50			10	8.50
Miners' helpers						
Labourers	4	5.00	2	4.50	6	
Mechanics and skilled labour			2	5.50	2	
Boys	1	3.00	1	3.00	2	
Japanese						
Chinese						
Indians						
Totals	17		5		22	

Name of seams or pits—Nos. 1 and 2 tunnels.

Description of seams, tunnels, levels, shafts, etc., and number of same—No. 1 tunnel, in rock, 500 feet in length. No. 2 tunnel: Driven on strike; general direction, N. 29° 50′ W. (ast.); coal average, 9 feet; average pitch, 22 degrees; length of level, 3,600 feet.

Description and length of tramway, plant, etc.—No. 1 tunnel tramway, 800 feet; No. 2 tunnel tramway, 4,000 feet. Three boilers—two 120 horse-power and one 22 horse-power; air-compressor, 120 lb. pressure.

EAST KOOTENAY INSPECTION DISTRICT.

REPORT OF ROBERT STRACHAN, SENIOR INSPECTOR.

I have the honour to submit the annual report of the coal-mines operating in the Crowsnest Pass Inspection District during the year 1919.

These consisted of Coal Creek Colliery of seven mines—the Michel Colliery with three mines, which are owned by the Crow's Nest Pass Coal Company, Limited, of Toronto, and four mines (including the open-cut) at Corbin Colliery, owned by the Corbin Coal and Coke Company, of Spokane, U.S.A.

No attempt was made to reopen either the Carbonado Colliery, of the Crow's Nest Pass Coal Company, Limited, at Morrissey, which was shut down in 1909, or the Hosmer mines, belonging to the Canadian Pacific Railway Natural Resources Department, closed in 1914.

There were only two companies operating during the year, the Crow's Nest Pass Coal Company, Limited, working the Coal Creek Collieries and the Michel Collieries, and the other company, the Corbin Coal and Coke Company, working the mines at Corbin, including the open-cut termed the "Big Showing."

In the early part of the year the mines worked short time, due to lack of demand for coal, and in May they were practically shut down owing to a dispute between the companies and their workmen over the adjustment of wages resulting from the reduction by Statute of the hours of employment of outside employees; this later developed into a deadlock over the question of the recognition of which organization the workmen should belong to, whether the United Mine Workers of America or the One Big Union. It was August 25th before work was resumed after three months of idle time, during which no attempt was made to operate the mines, and in the early part even the fans were shut down.

The output of coal of the district for the year was 558,806 tons, showing a decrease of 175,065 tons, the cause of which has already been explained. The decrease is fairly distributed: Coal Creek, 96,272 tons; Michel, 33,544 tons; Corbin, 45,249 tons. The Corbin Colliery shipped during the stoppage about 12,000 tons from the stock accumulated the previous year.

An interesting point is the decrease in tonnage per day worked per mine, showing at Coal Creek a decrease from 7.02 tons in 1918 to 4.835 tons in 1919. Michel shows a similar falling-off, but not so great, being, in 1918, 6.01 tons per miner per day worked and only 4.844 tons in 1919; therefore the decrease in Coal Creek is 2.185 tons and in Michel 1.66 tons. In Corbin it is very hard to find the tonnage per man owing to the coal being mined on the caving system and the amount produced at the "Big Showing" by the steam-shovel.

The amount of coke produced during 1919 was 57,067 tons, also showing a decrease, due partially to the stoppage of work, but more so to the closing-down of the smelter at Grand Forks.

ACCIDENTS.

Only one fatal accident was reported during the year; six serious and one slight. The fatal accident and five of the serious occurred in Coal Creek mines, one serious accident at Michel, and the slight at Corbin.

The fatal accident and one of the serious were due to falls of coal, and in both cases while the miner was attempting to hew it down. The practice of withdrawing the sprags and then getting under the overhanging coal to cut it down is a pernicious one, and can only be prevented by stricter discipline in the mine with the view of trying to protect the workmen from their own foolish actions.

The other five serious accidents were due to haulage-cars getting off the track and drivers g tting caught between the sides and the moving car. More attention to the condition of the track, with a reasonable amount of space between the sides and the cars, should remedy this condition, and should be given more consideration, especially when we consider that this class provides 62 per cent. of our accidents.

The slight accident occurred in Corbin mines, due to a workman sticking his pick in a piece of timber to haul it; the pick glanced off the timber, puncturing his leg, and illustrates that greater caution is required by the workmen in using even his ordinary tools.

The list of accidents, it is pleasing to report, is very much shorter than last year, showing for all classes of accidents a reduction of 48 per cent. and in the fatal class a reduction of 80 per cent.

The general condition of the mines has been fairly good, and, although large volumes of methane are given off, careful inspection shows that only in one case has the air-current carried a larger percentage than that allowed by the standard of withdrawal provided for in section 11 of the 1919 amendment to the "Coal-mines Regulation Act," and this was owing to a derangement in the ventilation system, which was rapidly adjusted.

In future a more general use of the Burrell gas-detector is to be made by the firebosses by testing the mine-air current at fixed points and keeping a record of the same; this, if carried out consistently, with the measurement of the ventilation and careful observation of the barometrical reading, should give us a lot of information as to whether the amount of methane given off is simply due to the breaking-down of the coal or whether it is increased owing to the fall in the barometer.

Another item which I think should be given consideration is the means of communicating between the fan and the interior of the mine. In the event of a break-down in the ventilating machinery a long time must necessarily elapse before information can be conveyed to the men at the working-faces, so as to enable them to retreat, and it should be remembered that in mines with a methane production such as is found in this district every minute is of value.

No new fans have been installed during the year, although at least two have been under consideration for some time.

Bumps.

No severe bumps have been experienced during the year, although many small knocks or jars have been felt without any serious damage. The repair-work on the Main Level district of No. 1 East mine, Coal Creek, where the bump was experienced in 1916, is now within 150 feet of the face. In this mine the term "bump" has become so common that almost everything heard or felt is ascribed to a bump and leads to very many misapprehensions.

Blow-outs.

Several blow-outs have been experienced during the year, varying from the displacement of a few tons of coal to as much as 260 tons of very fine dust. The most severe or largest blow-out occurred on December 1st last in the No. 6 room, North side of No. 10 East slope, but fortunately sufficient warning was given to allow the workmen to escape. In every case these blow-outs are accompanied by the effusion of large volumes of methane, and are generally understood to be the result of gases under high pressure.

In the latter part of the year an attempt was made to relieve this gas under high pressure by drilling boreholes ahead in suspected areas, with very encouraging results so far as the areas experimented with were concerned. After careful observations by the management it was agreed that when certain conditions appeared in the coal strata a blow-out could nearly always be anticipated, and the drilling was used to allow the gases to bleed off. The results on the South side of the No. 10 East slope have been very encouraging, and even on the North side almost ten hours before the blow-out occurred it was anticipated.

The work of drilling is carried out on the midnight shift, when the minimum number of workmen are in the mine, and although the same amount of gas is given off by the drilling as by the blow-out, it is to a certain extent under control and allowed to bleed freely off at a time when it can do the least harm. The present outfit for drilling consists of an ordinary auger with extensions to allow of drilling 20 feet; in the future it may be found advisable to use larger diameter holes and of greater length.

In dealing with this question the careful observations of the firebosses and overman have been of great value in determining the means of reducing the danger from the blow-outs.

Mine Fires.

No new mine fires have been reported during the year, although that at Corbin has required careful watching and extensive concrete stoppings have been built to prevent it spreading.

Lighting.

No open lights are used in any of the mines and the majority of the workmen are furnished with the Edison electrical safety-lamp, while the Wolf safety-lamp is used for examining the mine and the Burrell gas-detector is used for determining in the mine-air lower percentages of gas than can ordinarily be determined with the use of the Wolf safety-lamp. There are 1,022

electric mine-lamps and 168 Wolf safety-lamps in use, while there are ten Burrell gas-detectors. At all the collieries substantial lamp-rooms are provided for dealing with the lamps and testing the same before they are issued to the workmen.

Although searches were made regularly during the year, no matches or other articles contrary to Rule 9, section 91, of the "Coal-mines Regulation Act" were found, and only one prosecution was made during the year for breach of the special rule in going beyond a fence erected to prevent workmen from going into a dangerous place. A separate list shows the name of the party prosecuted, the penalty, and date of offence.

The Use of Explosives.

Explosives are used very sparingly at Coal Creek and only for rock-work; to a greater extent for the production of coal, both at Michel and Corbin.

The total amount of explosives used was 12,550 lb., made up of: Monobel, 7,333 lb.; Polar Permitite, 1,730 lb.; Dynobel, 1,000 lb.; 40-per-cent. dynamite, 87 lb.; and 2,300 lb. stumping-powder.

At Coal Creek 1,088 lb. of Polar Permitite was used in 1,696 shots, showing an average of 0.64 lb. a shot in rock-work.

At Michel 5,714 lb. of Monobel was used in 10,774 shots, an average of 0.53 lb. a shot; 1,000 lb. of Dynobel in 1,050 shots, with an average of 0.94 lb. a shot; and 281 lb. of Polar Permitite was used in 260 shots, an average of 1.08 lb. a shot.

At Corbin 1,719 lb. of Monobel, 361 lb. of Polar Permitite, and 87 lb. of 40-per-cent dynamite was used in 2,724 shots, allowing 0.79 lb. a shot. This was mostly used in the underground operations, and 2,300 lb. of stumping-powder was used in 120 holes at the "Big Showing" or open-cut, allowing 19.16 lb. a shot.

Only one miss-fire was reported, and this was at Corbin with fuse, and practically all the shots were fired with electric detonators, with the exception of the 120 at the open-cut or "Big Showing" at Corbin.

I have not tried to show how many tons of coal was produced to the pound of explosives used, as this would be very unreliable owing to the fact that in Coal Creek, the largest producer, no coals are brought down with explosives, while in Michel explosives are used in every mine to bring down the coal, and at Corbin a large amount of explosives is used in stripping the cover off at the open-cut.

Coal-cutting Machines.

Very few coal-cutting machines are in use owing to the soft nature of the coal. At Coal Creek two machines of the post type, driven by compressed air, produced 630 tons of coal, while in Michel three of the same type produced 7,053 tons, or a total of 7,683 long tons.

At Corbin a large quantity of coal is produced by a steam-shovel, but this has not been generally termed a coal-cutting machine, rather being of the nature of a loader.

Mine-rescue Training and First Aid to the Injured.

In the work of mine-rescue training only five new workmen took a full course of training, of whom four were successful in obtaining certificates. Twenty-six, all from Coal Creek mines, took sufficient lessons to make themselves acquainted with the Gibbs mine-rescue apparatus, six of which have been installed at the Government mine-rescue training-station at Fernie. The work of first aid has been very well maintained during the year, in spite of the discouragement due to the idle time.

An effort was made to establish a Safety-first Association in the latter part of the year, and thanks to the financial assistance of the Vancouver Island Safety-first Association and W. R. Wilson, general manager of the Crow's Nest Pass Coal Company, a team of six was enabled to take part in the safety-first and mine-rescue contest at Nanaimo on September 1st, in which the Fernie team took third place and was only surpassed by the two teams from the United States. I am enclosing a photo of the team which you might be able to use in the Annual Report.

The amount of mine-rescue apparatus at the various mines is similar to last year, and I think it is almost time efforts were made to bring it up to date, most of it consisting of the Draeger type, which has been condemned in nearly every mining country where rescue apparatus has been in line with other mining developments.

I have already in previous reports pointed out the lack of interest in this work, and can only repeat the same story; even in the case of the Gibbs mine-rescue apparatus, which is generally conceded to be up to date, only the workmen from Coal Creek have gone to the trouble of making themselves acquainted with it. In the case of Michel and Corbin the excuse is the cost of coming to Fernie and the lack of payment for this kind of work.

I should very much like if the work of this Department could be made elastic enough to visit both Michel, Coal Creek, and Corbin, preferably by having a railway-car fitted up as is done in the neighbouring Province of Alberta and in several of the States south of the line.

In the last month of the year a safety inspector has been appointed by the Crow's Nest Pass Coal Company for the Coal Creek Colliery, and should be of great assistance in reducing our accident list.

In conclusion, I wish to thank the workmen and the officials of the various collieries for their assistance in carrying out our duties during the year, and trust for a continuation of the same during 1920, so that we may all work together in an earnest endeavour to make the condition safer and better in what is admittedly a most dangerous occupation.

Attached is a list of the accidents reported, prosecutions, and a brief description of the various mines by Inspector of Mines William Lancaster, accompanied by charts showing the gas production in several of the most dangerous mines, and charts showing accident-rate for the past ten years and the output of coal and coke for the past two years.

Crow's Nest Pass Coal Company, Ltd.

Capital, $3,500,000.

Officers.	*Address.*
Elias Rogers, President,	Toronto, Ont.
E. C. Whitney, Vice-President,	Ottawa, Ont.
R. M. Young, Secretary,	Fernie, B.C.
Elias Rogers, Treasurer,	Toronto, Ont.
W. R. Wilson, General Manager,	Fernie, B.C.
Bernard Caulfield, Colliery Manager, Coal Creek Collieries,	Fernie, B.C.
Thomas H. Williams, Colliery Manager, Michel Collieries,	Michel, B.C.

The above company is now operating the following extensive collieries on the western slope of the Rocky mountains in the East Kootenay District, namely:—

COAL CREEK COLLIERY, situated on Coal creek, about five miles from the town of Fernie, on a branch railway to the mines, connected at Fernie with the tracks of the Canadian Pacific Railway and also those of the Great Northern Railway.

CARBONADO COLLIERY, situated on Morrissey creek and connected by a branch railway with the Canadian Pacific Railway and the Great Northern Railway at Morrissey. The colliery is about fourteen miles from Fernie by rail in a south-easterly direction. This colliery has been shut down since 1909.

MICHEL COLLIERY, situated on both side of Michel creek, on the line of the Canadian Pacific Railway, being twenty-three miles in a north-easterly direction from Fernie. This last colliery is in the Northern Inspection District.

The amount and disposition of this combined output of the company's collieries is fully shown in the following table:—

COMBINED RETURNS FROM CROW'S NEST PASS COAL CO.'S MINES FOR YEAR 1919.

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	39,791		48,996	
" export to United States	311,469		8,134	
" " other countries				
Total sales		351,260		57,130
Used in making coke	85,735			
" under colliery boilers, etc.	42,087			
Total for colliery use		127,822		
		479,082		
Stocks on hand first of year	121		375	
" last of year	98		312	
Difference taken from stock during year		23		63
Output of colliery for year		479,059		57,067

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	40		14		54	
Whites—Miners	489				489	
Miners' helpers						
Labourers	145		155		300	
Mechanics and skilled labour	250		133		383	
Boys	11		18		29	
Japanese						
Chinese						
Indians						
Totals	935		320		1,255	

COAL CREEK COLLIERY.

Bernard Caulfield, Manager; James Taylor, Assistant Manager.

This colliery, the mines of which are situated on both sides of Coal creek, is connected to both the Canadian Pacific and Great Northern Railways by five miles of track termed the Morrissey, Fernie & Michel Railway.

The mines operated during the year were: On the North side, No. 1 North, No. B North, and No. 9; on the South side, No. 1 South, No. 1 East, and No. 2 seam.

Nos. 2, 3, and 9 mines are working the No. 2 seam, which varies in thickness from 5 to 8 feet; the No. 1 mines are all working the No. 1 seam, which varies in thickness from 30 to 40 feet generally; only 10 feet of the bottom portion of the seam is worked. B North seam is about 5 feet thick; the height for the roads is gained by taking up 5 feet of bottom, which is inferior coal. The method of work is pillar and stall in all the mines; entries and rooms are driven

in pairs, leaving a large pillar between each pair; no pillars have been drawn during the year. The direction of dip of the above seams generally is east, varying from 8 to 12 degrees.

The haulage inside the mines generally is by horses gathering from the working-faces; the main haulage comprises compressed low-pressure air-hoists, compressed-air locomotives, endless rope, and gravity-inclines. No. 1 North, No. 1 South, and B North mines being situated higher than the tipple, gravity-inclines lower the cars down to the level of the tipple, from each incline the coal is taken to the tipple by steam and compressed-air locomotives.

The tipple is of steel construction and is 840 feet in length, extending across the valley; it comprises two separate and independent circular dumps, each driven by electric motors, delivering the coal into feed-conveyors that supply the shaking screens; the slack passes through the screens into hoppers, from which it is drawn and loaded into slack-cars; the screened coal is delivered on to a picking-table, which enables the foreign matter to be picked out before the coal passes into the railroad-car. Provision is made for the loading of coal both into open and box cars, and to reduce the breakage to a minimum two Smith hydraulic box-car loaders are provided.

The main power plant is situated on the north side of the creek; it consists of fourteen boilers, also an auxiliary plant on the south side consisting of three boilers; the total capacity of the whole of the plant is 2,200 horse-power. Three air-compressors have a total capacity of 6,000 cubic feet of free air a minute, compressing the air to 100 lb. a square inch; also a Canadian Rand high-pressure compressor with a capacity of 1,346 cubic feet of free air a minute, compressing the air to 1,100 lb. a square inch; the low-pressure provides power for the pumps and hoists inside of the mines; the high-pressure provides power for the air-locomotives.

The electric plant consists of two 400-ampere, 250-volt generators and one Crocker-Wheeler 280-ampere, 220-volt generator; all the above are driven by two separate Robb-Armstrong engines, 20 x 20 inches, which provide power for No. 1 South, No. 1 North, and B North fans, motors for the tipple, and lighting purposes.

A very well-equipped lamp-room is provided. There are now in use 670 electric head-lamps of the Edison type and ninety Wolf safety lamps, forty-five of which are used alternately. Wash and change room is provided for 950 workmen, steel lockers being used, and each workman provides his own soap and towel.

Large stable accommodation on the surface is provided for all the mine-horses. Adequate machine, blacksmith, carpenter, and repair shops are maintained at the mines in addition to those at Fernie; there are also large and commodious offices and warehouses built of hollow concrete blocks.

A large number of workmen's houses have been erected at Coal Creek for the convenience of the workers, and a very good train service is maintained with the town of Fernie, where the remainder of the workmen reside and the principal offices of the company are situated.

No. 1. East Mine.

John Caufield, Overman; Hy. Dunlap, Jas. Duncan, Thos. Reid, and Jas Maltman, Firebosses.

This mine is on the south side of the valley, east of the tipple, at an elevation of 800 feet. The seam is reached by a crosscut tunnel at a distance of 215 feet from the entrance. Since the occurrence of the bump in November, 1916, which destroyed most of the workings, work has been going on to recover the Main tunnel and is now about 150 feet from the face; also a new airway, counter to the above, is being made. The present production of coal is from the dip, which is reached by two slopes, No. 10 and No. 14.

Ventilation is produced by a double-inlet fan of the Guibal type, driven by belt from a 125-horse-power steam-engine, capable of producing 140,000 cubic feet of air a minute, with a 3.6-inch water-gauge.

The mine is ventilated by three separate splits. North split: 18,000 cubic feet of air a minute for the use of thirty men and three horses, or 461.5 cubic feet for each unit. South split: 40,000 cubic feet of air a minute for the use of thirty men and four horses, or 952.4 cubic feet for each unit. West split: 16,000 cubic feet of air a minute for the use of twelve men and one horse, or 1,066 cubic feet for each unit.

Highest percentages of methane we found by the Burrell gas-detector was in the South split, which varied throughout the year from 1 to 1.8 per cent.

During our inspection throughout the year we found explosive gas six times, generally in cavities above the timbers; owing to the soft nature of the coal it is very difficult to prevent

having these cavities. The roadways were well timbered and the "systematic timbering" order was well maintained at the working-faces. Generally, conditions were good.

No. 1 South Mine.

This mine is situated half a mile west of the tipple and works the west portion of the No. 1 seam on the south side of the valley. Ventilation is produced by a 4- x 8-foot Keith fan driven by an electric motor, producing 39,000 cubic feet of air a minute, running 254 revolutions a minute, with a 2.9-inch water-gauge. The ventilation of this mine is all on one circuit; the above quantity is for the use of sixty-six men and twelve horses, or 382 cubic feet a minute for each unit.

During the year we found explosive gas on five occasions, generally in cavities above the timbers, and the percentage of methane in the air-current has always been kept below the adopted standard. Roadways were well timbered and the "systematic timbering" order was well maintained by the miners at the working-faces. Generally, conditions throughout the mine were good.

No. 1. North Mine.

Jos. Worthington, Overman; Ed. Rutledge, Matthew Turnbull, and John Charnock, Firebosses.

This mine is on the north side of the valley, working the west portion of the No. 1 seam. Owing to being under lighter cover and near the outcrop, no trouble is experienced in bumps or the giving-off of high percentages of methane.

Ventilation is produced by a 4- x 7-foot Keith fan driven by an electric motor, producing 27,000 cubic feet of air a minute for the use of fifty men and eight horses, or 365 cubic feet a minute for each unit.

During the year we found explosive gas on two occasions in small quantities, and the percentage of methane in the air-current has always been below 0.7 per cent. Roadways and working-places are all very well timbered, and generally conditions throughout the mine are very good.

B North Mine.

Wm. Commons, Overman; Jas. White, Herbert Parsons, and Evan Jones, Firebosses.

This is the only mine that is working the B seam, it is situated east of the tipple and about 200 feet vertical above No. 1 seam.

Ventilation is produced by a 10- x 3-foot Brazil fan, driven by an electric motor, producing 36,000 cubic feet of air a minute, with a 1-inch water-gauge.

Ventilation is divided into two separate splits. Incline split: 17,400 cubic feet of air a minute for the use of twenty men and two horses, or 670 cubic feet a minute for each unit. Slope split: 14,000 cubic feet of air a minute for the use of thirty men and four horses, or 333 cubic feet a minute for each unit.

During the year we found explosive gas three times in very small quantities, generally from feeders in the roof. The percentage of methane in the return air-current has been kept below the adopted standard; it varied from 0.8 to 1.5 per cent., shown by the Burrell gas-detector. Roadways and working-places generally have been kept in good condition; also the mine has been kept fairly free from coal-dust.

No. 2 Mine.

Carmichael McNay, Overman; Jas P. Bushnell, Walter Clarkestone, and Ernest Ward, Firebosses.

This mine is situated on the south side of the valley, the Main tunnel being on the same level and in an almost direct line with the tipple, and is working the south and west portion of No. 2 seam.

Ventilation is produced by an 8- x 16-foot Wilson fan, driven by a 125-horse-power steam-engine, capable of producing 150,000 cubic feet of air a minute, against a 4-inch water-gauge.

The ventilation is divided into two separate splits. Rock Tunnel split: 14,000 cubic feet of air a minute for the use of forty-five men and five horses, or 233 cubic feet a minute for each unit. High Line split: 10,000 cubic feet of air a minute for the use of seven men and one horse, or 1,000 cubic feet a minute for each unit.

Explosive gas has been found three times during our inspection throughout the year, and the percentage of methane in the air-current has been kept below 1 per cent. Roadways are in good condition, but parts of the airway are small and same is being enlarged: timbering in the working-faces was good. Generally, conditions throughout the mine were good.

No. 3 MINE.

John Biggs, Overman; W. A. Brown, Ed. Caufield, and R. S. Phillips, Firebosses.

This mine is working the dip portion of No. 2 seam on the south side of the creek.

Ventilation is produced by an 8- x 16-foot Wilson fan, which is producing 60,000 cubic feet of air a minute, with a 3.5-inch water-gauge, and driven by a 125-horse-power steam-engine.

The ventilation is divided into two separate splits. Incline split: 18,000 cubic feet of air a minute for the use of thirty men and four horses, or 430 cubic feet a minute for each unit South Level split: 23,000 cubic feet of air a minute for the use of thirty-four men and five horses, or 450 cubic feet a minute for each unit.

Throughout the year explosive gas has been found by us three times in small quantities, and the percentage of methane in the return air-current has been kept below the adopted standard. The roadways and working-places are all very well timbered, and generally conditions throughout the mine are very good.

No. 9 MINE.

Robert Fowler, Fireboss.

This mine is of the same seam as Nos. 2 and 3 mines, but on the north side of the creek. The present work is driving the Main level (which is in faulty ground) and improving the airway.

Ventilation is produced by a 7- x 16-foot fan of the Guibal type, capable of producing 100,000 cubic feet of air a minute. Very little active mining is being done and the fan is only running about half-speed. The measurement in the last crosscut was 10,000 cubic feet of air a minute for the use of seven men and one horse, or 1,000 cubic feet a minute for each unit. The percentage of methane has always been below 0.5 per cent., and we found explosive gas twice; this was in small quantities in cavities above timbers. General conditions have been good.

The following are the official returns from the Coal Creek Collieries for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	25,848		12,640	
" export to United States	234,797		988	
" " other countries				
Total sales		260,645		13,628
Used in making coke	17,806			
" under colliery boilers, etc	27,763			
Total for colliery use		45,569		
		306,214		
Stocks on hand first of year	121		134	
" last of year	98			
Difference taken from stock during year		23		134
Output of collieries for year		306,191		13,494

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.*

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	25		8		33	
Whites—Miners	315				315	
Miners' helpers						
Labourers	96		60		156	
Mechanics and skilled labour	171		79		250	
Boys	9		9		18	
Japanese						
Chinese						
Indians						
Totals	616		156		772	

* Does not include Fernie coke-ovens; not operated since April 4th, 1919.

The following shows the number of days Coal Creek Colliery worked each month during 1919:—

January	26	August*	9
February	12	September	25
March	19	October	26
April	17	November	25
May*	16	December	25
June*			
July*		Total	200

* Miners on strike from May 24th to August 18th.

Name of seams or pits—No. 1 North, No. 1 South, and No. 1 East, same seam; No. B, Nos. 2, 3, and 9, same seam.

MICHEL COLLIERY.

Thomas H. Williams, Manager.

This colliery, operated by the Crow's Nest Pass Coal Company, Limited, is situated on both sides of Michel creek, and is about twenty-four miles east of Fernie, on the Crowsnest Pass branch of the Canadian Pacific Railway, the Great Northern Railway's Rexford branch also connecting to the mines. The mines operated during the year were No. 3 and No. 3 East on the south side of the creek and New No. 8 on the north side.

No. 3 and No. 3 East mines are working the upper portion of No. 3 seam, which varies in thickness from 7 to 12 feet; No. 8 seam is about 12 feet thick; the above seams have an average dip of 12 degrees to the south. Method of work in all the mines is pillar and stall; some pillar-work has been done in No. 3 East and No. 8.

The haulage consists generally of horses gathering cars from the working-places to the landings, where it is hauled up the slopes or lowered down inclines by compressed-air hoists and then hauled to the tipple by compressed-air locomotives.

No. 8 mine is situated 500 feet above the tipple. The coal is dumped in a bunker at the top of the incline, from which a skip is loaded, taking the coal down to another bunker at the bottom of the incline on the same level as the tipple; mine-cars are reloaded and taken to the tipple by endless-rope haulage.

The tipple is built of steel and is 664 feet long and 14 feet wide. All the coal from the South side is weighed at the foot of the tipple incline; here there is a Green car-haul consisting of double endless-chain arrangement, which travels on car-wheels with axles which acts as spreader-bars, as pushers, and as retarders of the mine-cars when on the incline. Tracks for the mine-cars are inside the tracks for the cross-bar wheels, and when the car is delivered to the chain-haul the cross-bar moves up to the rear car-wheels and pushes the car up the incline to the

dump. The dump, which is simply a continuation of the track, increases from 20 to 60 degrees pitch, and when on this pitch the door of the car opens and the coal is discharged into the dump; the crossbar, continuing to travel around a large sprocket-wheel, carries the rear end of the car with it over the sprocket to the upper or overhead track, by which the car returns down the incline.

On the North or No. 8 side the cars are dumped by automatic dump, and after being dumped a transfer arrangement allows them to return underneath the loaded track to the endless rope, which takes the cars to the bin at the foot of No. 8 incline.

The tipple is fully equipped with picking-tables and screens, and the slack is taken by a belt-conveyor to the slack-bins, from which it is drawn and hauled by steam-locomotives to the coke-ovens. All the machinery around the tipple is driven by electric motors; there are also Smith gravity box-car loaders, which allow the handling of coal into the cars with a minimum breakage.

The boiler plant consists of eleven boilers with a total capacity of 1,600 horse-power; both boiler and power plant are housed in a fire-proof building of brick constructure. Power is provided for the hoists and pumps inside of the mine, also to No. 8 fan, by both a Walker and Rand compressor with a total capacity of 8,000 cubic feet of free air a minute, compressing to 100 lb. a square inch; also a high-pressure Rand compressor with a capacity of 1,450 cubic feet of free air a minute, compressing to 1,100 lb. a square inch. This provides power for the air-locomotives.

The electric-power plant consists of two 250-kw. generators; each supplies the tipple motors and other machinery, and also for lighting purposes around the plant and the town of Michel.

A very well-equipped lamp-room is maintained, and 331 Edison electric head-lamps are in use, also thirteen Wolf safety-lamps for testing purposes. Burrell gas-detectors are in use in all the mines to determine very low percentages of methane, which cannot be detected by the ordinary safety-lamp.

Large stables are provided for both mine and surface horses. A large wash-house and change-room with steel lockers is provided for all the workmen, who provide their own soap and towels. There are machine, blacksmith, carpenter, and car-repair shops, besides warehouses and offices.

No. 3 Mine.

Matthew Littler, Overman; Andrew Frew, Thos. James, and Alfred Davies, Firebosses.

The upper portion of this seam is being worked; it is reached by the Main tunnel, which intersects Nos. 3, 4, and 5 seams; Nos. 4 and 5 being abandoned.

Ventilation is produced by a 6- x 12-foot fan of the Guibal type, driven by a 125-horse-power steam-engine, producing 50,000 cubic feet of air a minute, fan running 118 revolutions a minute, with a 1.6-inch water-gauge.

The mine is ventilated by two separate splits. East split: 14,000 cubic feet of air a minute for the use of fourteen men and two horses, or 700 cubic feet for each unit. West split: 24,000 cubic feet of air a minute for the use of forty-eight men and two horses, or 444 cubic feet for each unit.

In our inspections during the year we have never found explosive gas in any of the active workings; only once found gas in the old works, and the percentage of methane has been kept well below the adopted standard. The roadways were well timbered and timbering in the faces has been fairly well maintained. Generally, conditions have been good.

No. 3 East Mine.

Thos. Davies, Overman; Ben. Ball, Alfred Ball, and Wm. Picton, Firebosses.

This mine is working the east portion and Upper seam of No. 3 on the east side of the valley.

Ventilation is produced by a 8- x 16-foot Wilson fan, driven by a 125-horse-power steam-engine, producing 75,000 cubic feet of air a minute, with a 2.2-inch water-gauge.

The mine is ventilated by two separate splits. East split: 18,200 cubic feet of air a minute for the use of forty men and two horses, or 400 cubic feet a minute for each unit. West split: 36,000 cubic feet of air a minute for the use of forty-two men and four horses, or 667 cubic feet a minute for each unit.

Throughout the year we found explosive gas on two occasions; this was in small quantities, and the percentage of methane in the air-current has been kept below the adopted standard. The roadways were always kept in good condition and timbering in the faces good. Generally, conditions throughout the mine were very good.

No. 8 Mine.

Thos. Baybutt, Overman; Alec. Almond, John Marsh, M. McLean, and Ed. Ainsworth, Firebosses.

This mine is situated on the north side of the valley at an elevation of 535 feet above the tipple and is working the north portion of Old No. 8 seam, which was sealed off in 1911 owing to fire in the mine.

Ventilation is produced by a 4- x 8-foot Murphy fan, driven by a 40-horse-power compressed-air driven engine, producing 42,000 cubic feet of air a minute, with a 1.25-inch water-gauge, running 220 revolutions a minute.

The mine is ventilated by two separate splits. No. 6 Incline split: 18,000 cubic feet of air a minute for the use of fifty-six men and six horses, or 243 cubic feet a minute for each unit. No. 1 Incline split: 14,000 cubic feet of air a minute for the use of forty-six men and eight horses, or 200 cubic feet a minute for each unit.

Only once did we find explosive gas during the year, and this was a small quantity in a cavity in the roof; also the percentage of methane in the air-current has always been below 1 per cent. Roadways and working-faces were well timbered. Generally, conditions throughout the mine were good.

The following are the official returns from the Michel Collieries for the year ending December 31st, 1919:—

Sales and Output for Year.	Coal.		Coke.	
(Tons of 2,240 lb.)	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	13,943		36,356	
" export to United States	76,672		7,146	
" " other countries				
Total sales		90,615		43,502
Used in making coke	67,929			
Used under colliery boilers, etc	14,324			
Total for colliery use		82,253		
Stocks on hand first of year			241	
" last of year			312	
Difference added to stock during year				71
Output of collieries for year		172,868		43,573

Number of Hands employed, Daily Wages paid, etc. (including Coke-ovens).

Character of Labour.	Underground.		Above Ground.		Totals.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	15		6		21	
Whites—Miners	174				174	
Miners' helpers						
Labourers	49		95		144	
Mechanics and skilled labour	79		54		133	
Boys	2		9		11	
Japanese						
Chinese						
Indians						
Totals	319		164		483	

The following shows the number of days Michel Colliery worked each month during 1919:—

January	26	August*	5
February	15	September	25
March	22	October	25
April	19	November	25
May*	17	December	26
June*			
July*		Total	205

* Miners on strike from May 24th to August 25th.

Name of seams or pits—New No. 3 (top section of No. 3 seam); Old No. 3 (lower section of No. 3 seam); New No. 8 (Old No. 8 seam continued).

Corbin Coal and Coke Company, Limited.

Head Office—Spokane, Wash.

Capital, $10,000,000.

Officers.	*Address.*
D. C. Corbin, President,	Spokane, Wash.
J. K. O. Sherwood, Vice-President,	New York, N.Y.
Wm. Weaver Heaton, Secretary-Treasurer,	New York, N.Y.
A. M. Allen, Assistant Treasurer,	Spokane, Wash.
R. S. Ord, General Manager,	Spokane, Wash.
E. L. Warburton, Mine Manager,	Corbin, B.C.

Value of plant, $400,000.

CORBIN COLLIERY.

E. L. Warburton, Manager.

This colliery is situated on the East branch of the South fork of Michel creek, about fourteen miles from McGillivray Junction, on the Crowsnest branch of the Canadian Pacific Railway, and is connected to this by the branch line called the British Columbia Eastern Railway.

The colliery consists of Nos. 1, 3, and 4 mines. The whole of the coal produced during the year was from Nos. 3 and 4 mines. No. 1 seam has been sealed off on account of fire since the year 1913.

The No. 3 mine is situated 800 feet higher than the town of Corbin and at a distance of two miles away. This mine is reached by a standard-gauge switchback railway about six miles long, and is owned by the Coal Company; the hauling of the cars is by Shay locomotives, which are built specially for heavy grades.

To overcome some of the difficulties in the use of the snow-plough in winter, three turntables have been installed at the most convenient points along the road to enable the plough to be worked both ways, instead of having to back down to a wye to turn, which would mean a lot of time wasted, as the foremost point on the above railroad from the wye is about seven miles.

No. 3 mine being an open one, the coal is loaded directly into railroad-cars by the steam-shovel. The tipple is built of wood, and consists of coal-bins with a total capacity of 1,000 tons; also includes a Marcus screen for screening purposes.

The power plant consists of two 50-horse-power boilers of the locomotive type; two 120-horse-power boilers, tubular type; one 80-horse-power engine and dynamo, mostly used for lighting purposes around the plant, also for the town. There is a wash-house for the workmen, blacksmith and carpenter shops, warehouse and offices. There are now in use a few Edison electric head-lamps in addition to the Wolf safety-lamp, and a Burrell gas-detector for use in the mine.

Nos. 4, 5, and 6 Mines.

Jas. Blair, Overman; Geo. Luck, Geo. Elmes, and Hugh Osborne, Firebosses.

No. 4 seam is on the west side of No. 1 seam, and the upper workings are reached by an incline direct from the tipple. The seam varies from 50 to 200 feet in thickness and is vertical, and the work is retreating, extracting the pillars by the system of caving; this is easily done as the coal is very friable; chutes are so specially arranged that the coal falls towards them and very little of it is lost.

In the early part of the year fire broke out in the old No. 4 level; this was successfully sealed off by a stopping built of concrete.

Ventilation is produced by a 4- x 12-foot fan of the Guibal type, driven direct by a steam-engine, producing 21,000 cubic feet of air a minute, fan running 95 revolutions a minute, with a 0.5-inch water-gauge. The above quantity is for the use of eighteen men and one horse, or 1,000 cubic feet a minute for each unit.

This mine makes very little gas; we have never found explosive gas and the percentage of methane has never exceeded 0.5 per cent. The roadways are all well timbered. Generally, conditions are good. Nos. 4 and 5 are only in their prospect stages.

No. 3 Mine, or "Big Showing."

This mine is situated about two miles south of Corbin and about 800 feet higher. The operating portion of the seam has very little cover; it is composed of surface soil and coal-blossom; this is taken off and loaded into dump-cars by a steam-shovel.

Work is proceeded by a series of benches, the uppermost bench being in advance of the one below; where the coal is firm it is blasted, and the loose coal is loaded by the steam-shovel into railroad-cars. It is impossible to operate throughout the whole of the year; in the latter part of winter, generally there is a heavy snowfall which stops all operations for a time.

This being an open mine, there is nothing to mention with respect to ventilation; the work of supervision with respect to safety of the employees is very well maintained.

The following are the official returns for the Corbin Coal and Coke Company for the year ending December 31st, 1919:—

SALES AND OUTPUT FOR YEAR.	COAL.		COKE.	
Tons of 2,240 lb.	Tons.	Tons.	Tons.	Tons.
Sold for consumption in Canada	26,136			
" export to United States	61,879			
" " other countries				
Total sales		88,015		
Used in making coke				
Used under colliery boilers, etc.	4,538			
Total for colliery use		4,538		
		92,553		
Stocks on hand first of year	16,825			
" last of year	4,019			
Difference taken from stock during year		12,806		
Output of colliery for year		79,747		

NUMBER OF HANDS EMPLOYED, DAILY WAGES PAID, ETC.

CHARACTER OF LABOUR.	UNDERGROUND.		ABOVE GROUND.		TOTALS.	
	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.	No. employed.	Average Daily Wage.
Supervision and clerical assistance	5		4		9	
Whites—Miners	23				23	
Miners' helpers	7				7	
Labourers	30		35		65	
Mechanics and skilled labour			10		10	
Boys						
Japanese						
Chinese						
Indians						
Totals	65		49		114	

Name of seams or pits—No. 3 mine or "Big Showing," open work; No. 4 mine, "A" tunnel, underground mining; No. 5 mine, underground mining; No. 6 mine, prospect underground mining.

Description of seams, tunnels, levels, shafts, etc., and number of same—As per last annual report. Dirt-stripping during the year at No. 3 mine has been under contract to H. H. Boomer and about 150,000 yards of dirt removed. Average of thirty men employed since May, and these not shown on our return. Corbin Creek prospected and two seams located and 250 feet of tunnel-work put in, showing coal of good grade. Steam ash-blower installed at power-house. Main and tail rope haulage working at 400 level, No. 4 mine, displacing eight horses. Eighty per cent. of underground coal produced from pillar-work, No. 4 mine.

SUMMARY—TABLE SHOWING ACCIDENTS OCCURRING IN B.C. COLLIERIES IN TEN YEARS—1910 TO 1919.

For the year	1910.				1911.				1912.				1913.				1914.				1915.				1916.				1917.				1918.				1919.				Total for 10 years.			
Output of coal.....tons	3,139,235				2,193,062				3,025,709				2,570,760				1,810,967				1,972,580				2,485,580				2,398,715				2,578,724				2,408,948				24,583,244			
Number of persons employed	7,758				6,873				7,130				6,671				5,732				4,991				5,060				5,170				5,427				5,966				60,778			
Nature of Injury and Cause of Accident.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.
Gas explosions	..	..	6	6	..	..	10	10	7	2	3	12	..	..	13	13	..	1	2	3	23	2	8	33	12	..	..	12	38	..	..	38	..	..	1	1	..	..	..	..	80	5	43	128
Falls of coal	5	16	5	26	3	5	6	14	4	7	9	20	6	4	2	12	2	6	..	8	1	3	3	7	3	5	2	10	1	6	11	18	3	3	1	7	4	3	1	8	32	58	40	130
Falls of rock	8	15	12	35	..	5	24	29	5	9	10	24	11	9	3	23	2	14	..	16	4	7	4	15	7	6	7	20	2	4	14	20	4	10	3	17	4	11	3	18	47	90	80	217
Mine cars and horses	11	49	23	83	5	7	18	30	5	10	10	25	4	28	9	41	5	18	2	25	3	21	2	26	5	15	7	27	1	11	5	17	4	14	5	23	4	14	10	28	47	187	91	325
Powder, etc., explosion	1	1	3	5	..	1	2	3	2	1	..	3	..	2	..	2	2	3	..	5	..	.	1	1	..	..	1	1	..	..	1	1	..	..	2	2	.	.	1	1	5	8	11	24
Hoisting, ropes, etc	..	2	4	6	..	1	1	2	3	7	6	16	1	2	..	3	2	1	1	4	1	4	4	9	..	5	4	9	1	5	5	11	16	..	2	18	..	3	..	3	24	30	27	81
Mine timber	1	4	2	7	..	..	5	5	1	2	2	5	3	6	1	10	..	2	2	4	.	..	..	..	..	2	2	4	..	1	3	4	1	2	3	6	..	..	2	2	6	19	22	47
Underground, miscellaneous	1	4	4	9	4	..	5	9	..	4	4	8	..	..	6	6	3	..	..	3	19	1	3	23	1	3	5	9	1	2	5	8	..	1	2	3	..	..	4	4	29	15	38	82
On surface, miscellaneous	1	4	7	12	4	4	11	19	1	2	3	6	2	6	1	9	1	8	1	10	1	3	1	5	..	..	1	1	..	..	1	1	..	..	..	..	..	2	3	5	10	29	29	68
Totals	28	95	66	189	16	23	82	121	28	44	47	119	27	57	35	119	17	53	8	78	52	41	26	119	28	36	29	93	44	29	45	118	28	30	19	77	12	33	24	69	280	441	381	1,102

ACCIDENTS IN BRITISH COLUMBIA COLLIERIES DURING 1919.

| Cause of Accident and Nature of Injury. | Name of Colliery. | | |

ANALYSES OF ACCIDENTS DURING 1919.

District.	No. of Accidents per 1,000 Men employed.				Tons of Coal mined per Accident.			
	Fatal.	Serious.	Slight.	Total.	Fatal.	Serious.	Slight.	Total.
East Kootenay	0.73	4.38	0.73	5.84	558,806	93,134	558,806	69,850
Coast	2.41	5.65	5.00	13.48	154,486	62,939	70,806	27,409
Total for Province	2.01	5.53	4.00	11.73	200,746	70,851	96,358	34,413

PER CAPITA PRODUCTION OF COLLIERIES.

District.	Gross Tons of Coal mined in 1919.	Total Number of Men employed by Producing Collieries.	Tons of Coal mined per Man employed at Collieries.	Number of Men employed Underground in Producing Collieries.	Tons of Coal mined per Man employed Underground.
East Kootenay	558,806	1,369	408	1,000	558
Coast	1,850,142	4,597	402	3,145	588
Total for Province	2,408,948	5,966	403	4,145	581

ACCIDENTS IN MINES DURING 1919.

Coal-mines.

District.	Fatal.	Serious.	Slight.	Total.
East Kootenay	1	6	1	8
Nicola	..	1	2	3
Coast	11	26	22	59
Totals	12	33	25	70

Metal-mines.

West Kootenay-Similkameen	1	2	7	10
Coast	5	1	5	11
Totals	6	3	12	21
Grand totals of all accidents	18	36	37	91

DETAILED STATEMENT OF ACCIDENTS IN B.C. COLLIERIES DURING 1919.

COAST COLLIERIES.

Reported by Henry Devlin, John Newton, and James Dickson, Inspectors.

No.	Colliery.	Date.	Name.	Occupation.	Details.
1	Comox (C.C.)	Jan. 6	Wong Sun	Miner	Fatally injured by trip of car, which became derailed while running into siding off slope.
2	Wellington-Extension (C.C.)	" 11	William Clifford	Fireboss	Piece of rock fell from face and hit him, causing slight fractures of three ribs on right side.
3	Reserve (C.W.F.C.)	" 14	Peter Dwarski	Miner	Slipped on rail and fell, breaking bone in ankle.
4	Granby No. 1 (G.C.M.S. & P.C.)	" 16	Joe Motti	"	Piece of rock falling fractured right tibia about 3 inches above ankle.
5	Comox (C.C.)	" 27	Mah Len	Loader	Piece of centre rock fell off face, causing fatal injuries.
6	No. 1 (C.W.F.C.)	Feb. 3	Sandy Fulla	Brusher	Right leg broken by being hit by runaway car.
7	Granby No. 1 (G.C.M.S. & P.C.)	" 17	Mah Sue	Labourer (surface)	Thrown against post on side of track by moving car.
8	No. 1 (C.W.F.C.)	" 18	John Dean	Miner	Fractured left ankle, caused by falling coal.
9	Harewood (C.W.F.C.)	" 20	William Tait	"	Piece of rock fell out between timbers, breaking his left leg.
10	Reserve (C.W.F.C.)	" 26	Ralph Smith	Shotlighter	Lacerated wound and torn muscles of left leg; struck by flying coal when firing shot.
11	Wellington-Extension (C.C.)	Mar. 3	David Gourlay, Jr.	Labourer (surface)	Knocked down by runaway car, fracturing skull.
12	No. 1 (C.W.F.C.)	" 13	Charles Baird	Miner	Loaded car jumped off track, fracturing left leg.
13	Wellington-Extension (C.C.)	" 24	Patrick Noon	"	Compound fracture of left leg and three ribs broken by being hit by empty car.
14	No. 1 (C.W.F.C.)	" 24	Daniel Buchanan	Machine-runner's helper	Caught by machine through wearing loose jumper or blouse; broke three ribs and cut leg.
15	Comox (C.C.)	April 17	George Luchanski	Pusher	Simple fracture of right leg; hit by rope when lowering car.
16	Harewood (C.W.F.C.)	" 24	Henry Clark	Miner	Fatally injured by fall of top coal and clod.
17	Comox (C.C.)	" 26	S. Kimoto	"	When chopping piece of timber with axe, accidentally chopped top part of left thumb.
18	Comox (C.C.)	" 26	Chow Wing	Labourer (surface)	Run over by two loaded mine-cars on tipple-landing and fatally injured.
19	Reserve (C.W.F.C.)	May 2	John Konopka	Labourer	Bruised spine and compression of nerves; struck by rock which fell from face when he was helping to replace timber which had been displaced by a shot.
20	Wellington-Extension (C.C.)	" 8	John Orr, Jr.	Miner	Fall of rock caused fracture of left scapula; two ribs broken on left side; sprained ankle and contusion of back and left thigh.
21	Comox (C.C.)	" 10	James Smith	Driver	Squeezed between car and post and crushed in region of pelvis.
22	Wellington-Extension (C.C.)	" 10	Rocco Polifram	"	Cuts on legs and body and internal injuries; caught between cars and posts by jumping off trip of cars when in motion.
23	Comox (C.C.)	" 17	Minola Kobayashi	Loader	Crushed between two cars, causing fractured pelvis and internal injuries

COAST COLLIERIES—*Continued.*

No.	Colliery.	Date.	Name.	Occupation.	Details.
24	Granby No. 1 (G.C.M.S. & P.C.)	May 29	J. Baird	Rope-rider	Knocked down by trip and received internal injuries.
25	Reserve (C.W.F.C.)	" 29	Gustave Liebiecht	Miner	Fractured forearm, caused by a falling piece of coal.
26	Comox (C.C.)	June 9	Archibald Marshall	Timberman	Squeezed between motor and car, causing broken left leg.
27	Grant (N.W.C.C.)	" 10	Chin Suey	Rock-picker (surface)	Three fingers lacerated by having hand caught in pinion-gears.
28	Comox (C.C.)	" 12	Fang Jung	Miner's helper	Fractured femur of right leg, caused by falling rock.
29	No. 1 (C.W.F.C.)	" 23	Thomas Christian	Brusher	Fatally injured by fall of rock.
30	Comox (C.C.)	July 9	John Zanina	Rock-picker (surface)	Compound fracture of calsis of right foot, which was squeezed between picking-table and post.
31	Comox (C.C.)	" 9	Gust Spiron	Timberman's helper	Two fractured ribs on right side, caused by being squeezed between cars.
32	Granby No. 1 (G.C.M.S. & P.C.)	" 15	Robert Gregory	Pusher	Fractured femur above right knee, caused by car being derailed and hitting him.
33	Comox (C.C.)	" 17	Him Hang	Miner's helper	Fracture of left leg below knee, caused by piece of coal rolling over from rib.
34	Comox (C.C.)	" 21	Chin Tan	"	Struck by loaded trip of cars at mine tunnel entrance and fatally injured.
35	No. 1 (C.W.F.C.)	" 21	Charles Callow	Miner	Right collar-bone fractured and breast crushed; squeezed between two cars while coupling them.
36	Granby No. 1 (G.C.M.S. & P.C.)	" 23	Joe Petrowskey	Tracklayer	Ankle wrenched and small bone of right leg broken; scaffold on which he was standing broke.
37	Harewood (C.W.F.C.)	" 31	John Hitchen	Miner	Left leg broken by fall of rock.
38	Comox (C.C.)	Aug. 12	Emanuel Michaluk	Tracklayer	Fractured rib, caused by being hit by loaded car.
39	Comox (C.C.)	" 18	T. Kinura	Miner	Fatally injured by fall of coal.
40	Comox (C.C.)	" 18	Mah Sin	Miner's helper	Fractured left leg above knee and scalp-wound, caused by fall of rock.
41	Wellington-Extension (C.C.)	Sept. 6	Charles McLaughlin	Hoistman	Ends of three fingers of right hand cut off through having them caught between rope and drum.
42	Wellington-Extension (C.C.)	" 10	Alex. Kulai	Miner	Fatally injured by fall of coal.
43	No. 1 (C.W.F.C.)	Oct. 2	Robert Seggie	Fireboss	Killed by fall of rock.
44	Comox (C.C.)	" 3	Wong Foy	Loader	Injuries to back and head, caused by fall of coal.
45	No. 1 (C.W.F.C.)	" 9	Charles Killeen	Haulageman	Riding on trip of cars, the first one jumped off track and caught his leg between buffers of first and second cars, causing compound fracture of right leg above ankle.
46	Reserve (C.W.F.C.)	" 10	John Nazoroff	Pusher	While helping to put car on track got squeezed between car and post, fracturing ribs.
47	Granby No. 1 (G.C.M.S. & P.C.)	" 18	Robert Nisbet	Tipple foreman (surface)	Broken left leg below the knee, caused by being hit by empty car.
48	East Wellington (V.C.N.C.)	" 21	Joseph Sumers	Miner	Both bones in left leg and ankle broken by fall of rock.
49	Morden (P.C.C.M.)	" 25	William Wallace	"	Fractured left tibia, caused by fall of rock.
50	Granby No. 1 (G.C.M.S. & P.C.)	" 28	Jas. Clarkson, Sr.	"	Broken left foot and bruised side of chest by fall of clay.
51	Granby No. 1 (G.C.M.S. & P.C.)	Nov. 1	Joe Bardick	"	Compound comminuted fracture of right metacarpus and bruised ribs, right front; hit with shackle on end of rope.

COAST COLLIERIES—*Continued.*

No.	Colliery.	Date.	Name.	Occupation..	Details.
52	Comox .. .. (C.C.)	Nov. 6	Pistuo Galliazzi....	Miner	Dislocated right knee, rupture of ligaments, compound fracture of ribs on right side, and puncture of lungs made by ribs, caused by fall of rock.
53	Granby No. 1.... (G.C.M.S. &P.C.)	" 6	William Eastgate..	Machinist's Helper	Sprained ankle; foot caught by wheel of car, which caused him to fall.
54	Grant. ..... (N.W.C.C.)	" 8	August Bullens....	Miner	Bruised back, caused by fall of dirt which swung on sprag.
55	No. 1.... ..... (C.W.F.C.)	" 10	James Harley.....	Rope-rider	Collar-bone broken, caused by being squeezed between two cars.
56	Wellington-Extension (C.C.)	" 14	George Radford ...	Switcher.....	Fatally injured by runaway trip of cars.
57	Wellington-Extension (C.C.)	Dec. 18	Andrew Patterson..	"	Slight fracture of left leg above ankle; was thrown off car on which he was riding.
58	Comox..... (C.C.)	" 18	N. Gigenoff	Driver.....	Fractured ribs on right side; car jumped off track, swung around and hit him.
59	Reserve..... (C.W.F.C.)	" 26	Thos. Sanders.....	Miner	Fatally injured by fall of top coal while preparing to tamp a shot in it.

NICOLA COLLIERIES.

REPORTED BY ROBERT STRACHAN, SENIOR INSPECTOR.

60	Coal Hill..... (F.C.C.)	Jan. 6	William Skelton...	Pusher.....	Unloading car of timber and slipped, falling into car, twisting his right arm.
61	Middlesboro..... (M.C.C.)	Feb. 25	Wm. Cumberland..	Miner	Large toe on right foot broken by falling timber.
62	Middlesboro..... (M.C.C.)	Aug. 8	David Fairley	"	Fractured pelvis, lacerated urethra, and bruised back, caused by falling rock.

CROWSNEST PASS DISTRICT.

REPORTED BY ROBERT STRACHAN AND WILLIAM LANCASTER.

63	Michel .. .. (C.N.P.C.C.)	Jan. 27	S. Marchi	Miner	Fracture of right tibia and fibula, caused by fall of coal.
64	Coal Creek .... (C.N.P.C.C.)	Feb. 18	George King	Driver.....	Fractured right leg above ankle by being knocked down by car.
65	Coal Creek..... (C.N.P.C.C.)	April 11	Joseph Bella	"	Fractured ankle, caused by horse falling on him.
66	Coal Creek .... (C.N.P.C.C.)	May 9	Daniel Bohi.....	Rope-rider....	Compound fracture of right big toe; also two cuts on sole of foot.
67	Coal Creek..... (C.N.P.C.C.)	Sept. 15	Maria Oliva.....	Miner	Fatally injured by fall of coal.
68	Coal Creek..... (C.N.P.C.C.)	Oct. 9	William Stockwell.	Fireboss	Fractured left leg above ankle, caused by being knocked down by horse.
69	Coal Creek..... (C.N.P.C.C.)	" 20	Peter Piola.....	Rope-rider....	Fractured lower right arm, caused by having arm caught between car and post.
70	Corbin..... (C.C.C.C.)	Dec. 9	William Walhalla..	Miner	Punctured wound to left leg between knee and ankle, caused by his hitting his leg with pick.

PROSECUTIONS UNDER "COAL-MINES REGULATION ACT."

As is incumbent upon the Inspector, he has laid information before the local Magistrates in the following cases of infractions by the workmen in the mines of the General and Special Rules and Regulations which are provided for the safety of all underground employees. The carelessness of one man endangers the lives of his fellow-workmen, and is treated as a criminal offence.

The following prosecutions have been brought during the year for the offences noted; the judgments given by the Magistrate being shown:—

Date.	Name.	Mine.	Occupation.	Offence charged.	Judgment.
Sept. 11	Ching Sing....	No. 4, Comox..	Miner	Attempting to unram a miss-fire shot, contrary to sec. 91, General Rule 11, C.M.R.A.	Fined $10 and costs.
Sept. 11	Wong Hey....	No. 4, Comox..	"	Attempting to unram a miss-fire shot, contrary to sec. 91, General Rule 11, C.M.R.A.	Fined $10 and costs.
Dec. 22	Lugi Zavagno.	No. 1 South, Coal Creek..	"	Breach of Special Rule 61, going beyond fence	Fined $5 and costs.

METALLIFEROUS MINES SHIPPING IN 1919.

SKEENA.

SKEENA MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Belmont Surf Inlet	Surf inlet	Belmont Surf Inlet Mines, Ltd.	Surf Inlet	Gold, silver, copper.
Drum Lummon	Douglas channel	Drum Lummon Mines, Ltd.	Vancouver	Gold, silver, copper.
Patterson Group	Porcher Island	F. T. Patterson	Refuge Bay	Gold, silver.

NASS RIVER MINING DIVISION.

Dolly Varden	Alice Arm	Taylor Engineering Co., Ltd.	Vancouver	Silver.
Golkeish	Anyox	H. W. Heidman	Anyox	Gold, silver.
Hidden Creek	Anyox	Granby Cons. M. S. & P. Co.	Vancouver	Gold, silver, copper.
La Rose	Alice arm	Mils Donald	Alice Arm	Gold, silver, lead.
North Star	Alice arm	J. McAleenan	Alice Arm	Silver.

PORTLAND CANAL MINING DIVISION.

Premier	Salmon river	D. L. Pitt	Stewart	Gold, silver.

QUEEN CHARLOTTE MINING DIVISION.

Ikeda	Ikeda bay	Ikeda Mines, Ltd.	Vancouver	Gold, silver, copper.

BELLA COOLA MINING DIVISION.

Jacobson	Dean channel	Smelters Steel Co.	Seattle, Wash.	Iron.

OMINECA MINING DIVISION.

Copper Queen	Leach mountain	Fred Griffin	Telkwa	Silver, copper.
Cordillera	Kitsalas mountain	A. J. Thompson	Usk	Gold, silver, copper.
M. & K.	Legate creek	Mack Orr	Pacific	Gold, silver, copper.
Silver Standard	Hazelton	W. G. Norrie-Lowenthal	New Hazelton	Gold, silver, lead, zinc.
Victory	Hudson Bay mountain	D. C. Simpson	Smithers	Gold, silver, lead.

EAST KOOTENAY.

FORT STEELE MINING DIVISION.

Guindon	Moyie	Frank Guindon	Moyie	Silver, lead.
North Star	Kimberley	Thompson & McKinney	Kimberley	Silver, lead.
St. Eugene	Moyie	Consolidated M. & S. Co.	Moyie	Silver, lead.
Sullivan	Kimberley	Consolidated M. & S. Co.	Kimberley	Silver, lead, zinc.

WINDERMERE AND GOLDEN MINING DIVISIONS.

Hot Punch (Star)	Toby creek	J. E. Stoddart	Windermere	Gold, silver, lead.
Lead Queen	Frances creek.	Paul Denhart	Brisco	Silver, lead.
Monarch (Golden)	Field	Wm. Adkins	Field	Silver, lead.
Paradise	Spring creek	R. R. Bruce	Invermere [attle	Silver, lead.
Sitting Bull	Slade creek	W. A. Krippæhne	837 Henry Bld., Se-	Silver, lead.
Trojan	Slade creek	W. A. Krippæhne	837 Henry Bld., Se- [attle	Silver, lead.

WEST KOOTENAY.

AINSWORTH MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Bluebell	Riondel	S. S. Fowler	Riondel	Silver, lead.
Bonton	Jackson basin	D. Brandon	Silverton	Silver, lead.
Cork	Zwicky	W. E. Zwicky	Kaslo [Spokane	Silver, lead, inc.
Florence	Ainsworth	F. R. Wolfle.	517 Hutton Bldg.,	Silver, lead.
Gallagher	Ainsworth	H. McVicar	Slocan	Gold, silver, lead.
Grant	Woodbury creek	C. F. Olsen	Ainsworth	Silver, lead.
Hardie	Ainsworth	H. Giegerich	Kaslo	Silver, lead.
Highland	Ainsworth	Consolidated M. & S. Co.	Trail	Silver, lead.
Jessie	Woodbury creek	E. Johnson	Kaslo	Silver, lead.
Maestro	Ainsworth	H. Giegerich	Kaslo	Silver, lead.
No. 1	Ainsworth	Consolidated M. & S. Co.	Trail	Silver.
St. Patrick	Hammill creek	J. J. Brochier	Argenta	Silver, lead.
Silver Bear	South fork, Kaslo creek	W. E. Newton	Kaslo	Silver.
Silver Bell	South fork, Kaslo creek	W. E. Newton	Kaslo	Silver, lead.
Skyline	Ainsworth	H. Giegerich	Kaslo	Silver, lead.
Spokane	Ainsworth	J. C. McDougall	Ainsworth	Silver, lead.
Tariff	Ainsworth	Kennedy & Bridge	Ainsworth	Silver, lead.
Ten Day Man	Adamant	R. J. Hughes	Kaslo	Silver, lead.
United	Ainsworth	J. W. Smith	Ainsworth	Silver, lead.
Utica	Adamant	C. F. Caldwell	Kaslo	Silver, lead.
Whitewater	Retallack	W. H. Burgess	Kaslo	Gold, silver, lead.

SLOCAN MINING DIVISION.

Black Colt	Sandon	G. A. Petty	Sandon	Silver, lead.
Bosun	New Denver	J. P. McFadden	Sandon	Gold, silver, lead.
Capella	New Denver	W. R. Will	New Denver	Gold, silver.
Echo	Silverton	L. J. McAtee	Spokane	Silver, lead, zinc.
Eureka	Sandon	C. Cunningham	Sandon	Silver, lead.
Freddie Lee	Sandon	A. W. McCune	Box 275, Nelson	Gold, silver, lead.
Galena Farm	Silverton	H. J. Armstrong	Silverton	Silver, lead.
Gem	Carpenter creek	M. J. Byrne	Sandon	Silver, lead.
Hewitt	Silverton	C. Cunningham	Sandon	Silver, lead, zinc.
Idaho	Sandon	C. Cunningham	Sandon	Silver, lead.
Ivanhoe	Sandon	J. P. McFadden	Sandon	Gold, silver, lead, zinc.
Jo-Jo	Carpenter creek	Thos. Trenery	Rosebery	Silver, lead.
Lucky Jim	Zincton	A. W. B. Allen	Victoria	Silver, zinc.
Mollie Hughes	New Denver	H. Cleaver	New Denver	Gold, silver, lead.
Mowitch	New Denver	T. J. Lloyd	New Denver	Gold, silver.
Noonday	Sandon	O. V. White	Sandon	Silver, lead.
Number One	Sandon	J. M. Harris	Sandon	Silver, lead.
Ocean	Sandon	W. G. Clark	Sandon	Gold, silver, lead.
Omega	Sandon	J. M. Harris	Sandon	Silver, lead.
Queen Bess	Sandon	C. Cunningham	Sandon	Silver, lead.
Rambler-Cariboo	Three forks	W. A. Cameron	Sandon	Silver, lead.
Reco	Sandon	J. M. Harris	Sandon	Silver, lead, zinc.
Ruth	Sandon	J. Anderson	Kaslo	Silver, lead.
Silverite	Sandon	C. Cunningham	Sandon	Silver, lead.
Silversmith	Sandon	J. B. White	Spokane	Silver, lead.
Sovereign	Sandon	J. B. White	Spokane	Silver, lead.
Standard	Silverton	G. H. Aylard	Victoria	Silver, lead, zinc.
Surprise	Sandon	J. P. McFadden	Sandon	Gold, silver, lead, zinc.
Van-Roi	Silverton	C. Cunningham	Sandon	Silver, lead, zinc.
Wakefield	Silverton	C. Cunningham	Sandon	Silver, lead.
Wonderful	Sandon	C. Cunningham	Sandon	Silver, lead.

SLOCAN CITY MINING DIVISION.

Arlington	Springer creek	H. D. Curtis	Slocan	Silver, lead.
Black Prince	Springer creek	C. E. Cartwright	Vancouver	Silver.
Eastmount	Slocan	H. D. Lea	Slocan	Silver, lead.
Enterprise	Enterprise creek	S. S. Fowler	Riondel	Silver, lead.
Meteor	Slocan	W. A. Buchanan	Nelson	Gold, silver.
Neepawa	Enterprise creek	E. F. Roche	New Denver	Silver, lead.
Ottawa	Slocan	A. L. McPhee	Slocan	Silver.

NELSON MINING DIVISION.

California	Nelson	W. H. Turner	Nelson	Gold, silver.
Emerald	Salmo	J. Waldbeser	Salmo	Silver, lead.
Eureka	Granite	Vincent Development Co.	Granite	Gold, silver, copper.
Molly Gibson	Kokanee	Consolidated M. & S. Co.	Trail	Silver, lead.
Relief	Erie	A. D. Westby	Erie	Gold, silver.

ARROW LAKE MINING DIVISION.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Millie Mack	Burton	H. E. Forster	Wilmer	Gold, silver, lead.

TRAIL CREEK MINING DIVISION.

Centre Star	Rossland	F. S. Peters	Rossland	Gold, silver, copper.
I.X.L.	Rossland	John S. Baker	Tacoma	Gold, silver, copper.
Le Roi				
Le Roi No. 2	Rossland	P. S. Couldrey	Rossland	Gold, silver, copper.
Mountain Chief	Renata	J. W. Evans	Nelson	Silver, copper.
War Eagle	Rossland	F. S. Peters	Rossland	Gold, silver, copper.
White Bear	Rossland	Consolidated M. & S. Co.	Rossland	Gold, copper.

REVELSTOKE AND TROUT LAKE MINING DIVISIONS.

Lanark	Illecillewaet (Revelstoke)	W. B. Dornberg	Illecillewaet	Gold, silver, lead.
Silver Cup	Ferguson (Trout lake)	J. Anderson	Kaslo	Gold, silver, lead.

BOUNDARY.

GRAND FORKS MINING DIVISION.

Killarney	Lightning peak,	W. J. Banting	Edgewood	Silver, lead.
Rock Candy	Kennedy creek	Consolidated M. & S. Co.	Trail	Fluorite.
Union	Franklin camp	Lewis Johnson	Grand Forks	Gold, silver.

GREENWOOD MINING DIVISION.

Bell	Wallace mountain	F. F. Ketchum	Beaverdell	Gold, silver. lead.
Bounty	Beaverdell	P. E. Crane	Beaverdell	Gold, silver, lead.
Buster	Beaverdell	J. P. Kelly	Spokane	Silver.
Castor	Beaverdell	G. Hambly	Beaverdell	Silver, lead.
Don Pedro	Greenwood	L. Sortoine	Greenwood	Gold, silver.
Duncan	Wallace mountain	J. McKellar	Beaverdell	Silver, lead.
Emma	Eholt	Consolidated M. & S. Co.	Trail	Gold, silver, copper.
Granby	Phoenix	Granby Cons. M. S. & P. Co.	Vancouver	Gold, silver, copper.
Motherlode	Greenwood	Canada Copper Corporation, Ltd.	Allenby	Gold, silver, copper.
Napanee	Wallace mountain	E. G. Cummings	Beaverdell	Silver, lead.
Providence	Greenwood	A. J. Morrison	Greenwood	Gold, silver, lead.
Revenge	Beaverdell	P. E. Crane	Beaverdell	Gold, silver, lead.
Sally	Beaverdell	H. B. Morley	Penticton	Gold, silver, lead.
Standard Frac	Beaverdell	E. Nordman	Beaverdell	Silver.
Stemwinder	Phoenix	J. Cunningham	Phoenix	Gold, silver, copper.
Sunnyside	Kettle river	E. Williamson	Rock Creek	Gold, silver, lead.
Waterloo	Lightning peak	G. A. Rendell	Greenwood	Silver, lead.

OSOYOOS MINING DIVISION.

Golconda	Olalla	D. McEachern	Keremeos	Gold, silver, copper.
Horn Silver	Keremeos	E. W. Condit	Similkameen	Gold, silver.
Nickel Plate	Hedley	Gomer P. Jones	Hedley	Gold. arsenic.
Spotted Lake	Kruger mountain	F. Calvert	Oroville, Wn.	Magnesium sulphate.

SIMILKAMEEN, NICOLA, AND VERNON MINING DIVISIONS.

Copper Farm	Princeton	F. F. Foster	Princeton	Silver, copper.
Joshua	Stump lake	F. M. Hawkes	Quilchena	Gold, silver, lead, copper.
Mary Reynolds	Stump lake	R. R. Hedley	Nicola	Gold, silver, lead.

YALE, ASHCROFT, AND KAMLOOPS MINING DIVISIONS.

Mine or Group.	Locality.	Owner or Agent.	Address.	Character of Ore.
Basque	Basque	J. G. Miller	Vancouver	Magnesium sulphate.
Iron Mask	Kamloops	A. Wallinder	Kamloops	Gold, silver, copper.
Queen Bess	Kamloops	C. E. Max	Kamloops	Silver, lead.
Emancipation	Yale	W. Thompson	Jessica	Gold, silver.

LILLOOET AND CLINTON MINING DIVISIONS.

Ada B.	Clinton	Stewart Calvert Co.	Oroville, Wn.	Magnesium sulphate.
Ida May	Cadwallader creek	F. A. Brewer	Vancouver	Gold.
Lorne	Cadwallader creek	A. F. Noel	Lorne Mine.	Gold, silver.
Pioneer	Cadwallader creek	A. Ferguson	Vancouver.	Gold, silver.

SOUTH COAST.

VANCOUVER MINING DIVISION.

Britannia	Britannia Beach	E. J. Donohue	Britannia Beach	Gold, silver, copper.

NANAIMO MINING DIVISION.

Annex	Vananda	James Forbes.	Vananda	Silver, copper.
Cornell.	Vananda	James Raper.	Vananda	Silver, copper.
Ingersoll	Quathiaski	F. H. Rosher	Victoria	Silver, copper.
Marble Bay	Vananda	A. F. Eastman	Vananda	Gold, silver, copper.
Puget Sound Iron Co	Vananda	W. H. Lee	Vananda	Iron.

VICTORIA MINING DIVISION.

Blue Grouse	Cowichan lake	G. H. Kilburn	Vancouver.	Gold, silver, copper.
Hill 60	Cowichan lake	C. H. Dickie	Duncan	Manganese.

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LIST OF CROWN-GRANTED MINERAL CLAIMS.

CROWN GRANTS ISSUED IN 1919.

CASSIAR.

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
Betsay	Atlin	John Dunham	1262	38.97	Nov.
Crackerjack	"	Clarence Marmaduke Sands, Daniel Leary Sullivan, and Robt. Leonard Pelton	3286	36.74	July 26
Deadwood	"	John Hartman Senn	917	51.38	Nov. 1
Gold Bullion	"	Clarence Marmaduke Sands, Daniel Leary Sullivan, and Robt. Leonard Pelton	3288	48.20	July 26
Gold Hill	"	Clarence Marmaduke Sands, Daniel Leary Sullivan, and Robt. Leonard Pelton	3287	36.85	July 26
Golden Hope	"	John Dunham and Benjamin Green Nicoll	1263	30.26	Nov. 1
Hill Fraction	"	Royal Trust Co., Administrators of the estate of James Alexander, deceased	1264	15.32	Mar. 12
Mountain Boy	"	William McMath Roxborough	230	46.17	Nov. 29
Philadelphia Fraction	"	Royal Trust Co., Administrators of the estate of J. Alexander, deceased	207	1.90	Mar. 12
Sweepstake No. 1 Frac.	"	John Dunham and Benjamin Green Nicoll	3283	39.14	Nov. 3
Sweepstake No. 2	"	John Dunham and Benjamin Green Nicoll	3284	51.54	Nov. 3
Sweepstake No. 3	"	John Dunham and Benjamin Green Nicoll	3285	48.11	Nov. 3
Wiesel	"	Edward Hartrick Harrison	231	46.00	Oct. 11
Black Bear	Nass River	John H. McMullin, Official Administrator of the estate of Chas. Swanson, deceased, intestate	3811	51.65	Dec. 1
Ferro Fraction	"	John Walford Strombeck	3822	15.85	Feb. 19
Red Point Extension	"	Ole Evinsen	3810	47.52	Oct. 10
Red Point No. 1	"	Ole Pearson	3809	34.78	Oct. 10
Anderson	Omineca	Chas. S. Anderson	2490 R. 5	51.65	Dec. 9
Boulder	"	Katerine A. Knauss	6317 R. 5	46.94	Dec. 9
Coral Queen	"	Joseph E. Oppenheimer	532	17.96	Jan. 9
Golden Fleece	"	Delta Copper Co., Ltd.	1001	44.83	July 10
Indicator	"	Katerine A. Knauss	6318 R. 5	47.20	Dec. 5
Intrusive	"	Katerine A. Knauss	6319 R. 5	51.65	Dec. 9
Joe Fraction	"	Daniel J. Williams	533	18.89	Feb. 19
Silver Fox	"	Chas. S. Anderson	4097 R. 5	51.65	Aug. 14
Falls View	Portland Canal	Daniel Lindeborg	3223	43.92	Dec. 29
G. T. Fraction	"	Laura McEwan, Administratrix, etc., and Daniel Lindeborg	3222	24.18	Dec. 29
J. P. Fraction	"	Laura McEwan, Administratrix, etc., and Daniel Lindeborg	3211	7.74	Dec. 29
Union Fraction	"	Andrew Lindeborg	3215	35.21	Dec. 29
Unum Fraction	"	Duncan Cameron Barbrick	3216	11.56	Dec. 29
Win Fraction	"	Laura McEwan, Administratrix, etc., and Daniel Lindeborg	3224	5.49	Dec. 29
Big Thing	Skeena	Drum Lummon Mines, Ltd.	2597 R. 4	43.22	Sept. 16
Blue Bell	"	Robert Nowell	2485 R. 4	49.00	Oct. 10
Bunker	"	Drum Lummon Mines, Ltd.	2604 R. 4	51.65	Sept. 16
Caledonia	"	" "	2595 R. 4	45.60	Sept. 16
Cuprite	"	" "	2602 R. 4	44.56	Sept. 15
Drum Lummon	"	" "	2592 R. 4	51.65	Sept. 10
Dumfries	"	" "	2598 R. 4	26.80	Sept. 15
Grey Copper	"	" "	2603 R. 4	51.65	Sept. 15
Ibis	"	" "	2593 R. 4	51.65	Sept. 10
Index	"	" "	2601 R. 4	25.24	Sept. 16
I.X.L	"	" "	2591 R. 4	51.11	Nov. 3
Kitchener	"	" "	2596 R. 4	51.65	Sept. 10
Malachite	"	" "	2600 R. 4	44.80	Sept. 15
Marcia	"	Robert Nowell	2484 R. 4	41.35	Oct. 10
Mavis	"	Drum Lummon Mines, Ltd.	2594 R. 4	49.24	Sept. 10
Montaive	"	" "	2599 R. 4	44.24	Sept. 15
Wharf	"	" "	2605 R. 4	51.65	Sept. 15

EAST KOOTENAY.

Canton	Fort Steele	Consolidated Mining & Smelting Co. of Canada, Ltd.	5630 G. 1	41.56	Mar. 21
Cromarty	"	Edgar Gordon Montgomery	5632 G. 1	51.38	Mar. 22
Full House	"	Edgar Gordon Montgomery	5631 G. 1	48.94	Mar. 22
Notre Dame	"	Norman William Burdett	2993 G. 1	45.61	Mar. 22
Rowan	"	Consolidated Mining & Smelting Co. of Canada, Ltd.	4095 G. 1	51.65	Mar. 21

WEST KOOTENAY.

Broughton	Ainsworth	Francis Helme	12416 G. 1	33.66	Dec. 5
Gallagher Fraction	"	Alfred Demeau Wheeler	12413 G. 1	13.26	Jan. 23
Number Nine (9) Frac.	"	Consolidated Mining & Smelting Co. of Canada, Ltd.	9661 G. 1	50.04	Dec. 9
Six Friends	"	Patrick Joseph Sheran	3669 G. 1	41.70	Oct. 17

WEST KOOTENAY—*Continued.*

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
Black Cap	Nelson	John William Mulholland	12654 G. 1	27.20	Dec. 9
Black Diamond	"	William Thomas McDowell and William Ward, the younger	3413 G. 1	41.05	Jan. 9
Bullion	"	Geo. Thomas Webster	2190	47.19	April 14
Carthage	"	Cecil Robert Adams	2197 G. 1	49.76	April 14
Empress	"	Thos. Gallon, John Marshall McVay, Frederick Peter Drummond, and William Henry Rhomberg	12496 G. 1	45.71	Oct. 31
Excelsior	"	John William Mulholland	12657 G. 1	47.52	Dec. 9
Fern	"	John William Mulholland	12656 G. 1	50.00	Dec. 9
Garnet	"	Percy Ferdinand Horton	10809 G. 1	44.84	Sept. 25
Gem	"	John William Mulholland	12652 G. 1	50.59	Dec. 9
Golden Fawn	"	Thos. Gallon, John Marshall McVay, Frederick Peter Drummond, and William Henry Rhomberg	12493 G. 1	26.50	Oct. 31
Gordon	"	George Hopkins Green and Katherina McAvoy	12175 G. 1	16.05	Nov. 3
Iva	"	John William Mulholland	12655 G. 1	39.07	Dec. 9
Jewel	"	John William Mulholland	12653 G. 1	34.67	Dec. 9
Josie	"	Maximillian Henry Baskin	8925 G. 1	28.04	Nov. 25
Lucky Boy	"	Lincoln Rhodes Clubine and William Richard Salisbury	12600 G. 1	30.80	Oct. 4
Mint	"	Thos. Gallon, John Marshall McVay, Frederick Peter Drummond, and William Henry Rhomberg	12495 G. 1	45.10	Oct. 31
Mountain View	"	Thos. Gallon, John Marshall McVay, Frederick Peter Drummond, and William Henry Rhomberg	12494 G. 1	31.31	Oct. 31
Nelson	"	George Hopkins Green	12177 G. 1	22.03	Nov. 3
Pat	"	Cecil Robert Adams	2198 G. 1	48.38	April 14
St. Louis	"	George Hopkins Green and Katherina McAvoy	12176 G. 1	33.12	Nov. 3
Salmo	"	Lincoln Rhodes Clubine and Fred Arthur Denne	12601 G. 1	44.55	Nov. 25
Silver Dollar	"	Lincoln Rhodes Clubine and William Richard Salisbury	12599 G. 1	22.70	Nov. 4
Silver Dollar Fraction	"	Lincoln Rhodes Clubine and Fred Arthur Denne	12602 G. 1	6.43	Nov. 4
Standard	"	John William Mulholland	12658 G. 1	40.58	Dec. 9
Volunteer	"	Patrick Joseph Sheran	3670 G. 1	20.23	Oct. 17
Westminster Fraction	"	George Hopkins Green	12184 G. 1	6.07	Nov. 3
Wild Horse	"	Gertrude Kendall	4212 G. 1	47.01	April 14
X Ray	"	Gertrude Kendall	4213 G. 1	51.65	April 14
Zincton	"	Agnes Billings	10810	51.27	Oct. 14
Chief	Slocan	Henry John Wooley	2808 G. 1	33.23	Aug. 14
Denver	"	Henry John Wooley	2807 G. 1	36.48	Aug. 14
Mowitch	"	Dorethea C. Lloyd	4558 G. 1	49.42	Aug. 14
Rose Marie	"	John Cechelero, Joe Beber, Emil Betali, Attilio Calgaro, and August Morgenlate	4003	20.52	Dec. 1
St. Clair	"	John Cechelero, Joe Beber, Emil Betali, Attilio Calgaro, and August Morgenlate	4559 G. 1	7.27	Dec. 1
Tornado	"	John Peter Wilson	5537 G. 1	44.12	Oct. 14
Buckeye Fraction	Trail Creek	Consolidated Mining & Smelting Co. of Canada, Ltd	12277 G. 1	17.85	Oct. 14
Carn Brea	"	John T. Brunskill	3399 G. 1	48.60	Mar. 22
Ollie Fraction	"	Consolidated Mining & Smelting Co. of Canada, Ltd	12276 G. 1	0.75	Oct. 14
Parker Fraction	"	John T. Brunskill	4607 G. 1	30.70	Mar. 22
Umatilla	"	William R. Braden	4242 G. 1	26.28	Sept. 29
Wallaroo	"	Roy Manley Turner	3400 G. 1	45.00	Mar. 22

BOUNDARY.

Back Tail	Grand Forks	J. W. Graham, G. Wilson, Fridolph Werner, and R. Graham	1850 S.	51.20	Sept. 9
Canyon	"	William H. Stewart	2390 S.	49.88	April 25
Decimal Fraction	"	Consolidated Mining & Smelting Co. of Canada, Ltd	1651 S.	37.80	Feb. 26
Denver	"	Maurice Wallace Elliott	2169 S.	43.15	Sept. 27
Dominion	"	William H. Stewart	2386 S.	51.11	April 25
Dont Know	"	John Cory Cruse	2374 G. 1	23.20	Feb. 8
Evening Star	"	Margaret M. Kerman (wife of Herbert C. Kerman) and Kathleen S. Dewdney (wife of Walter R. Dewdney)	1321 S.	42.79	Sept. 27
Fluorspar	"	Consolidated Mining & Smelting Co. of Canada, Ltd	1650 S.	51.65	Mar. 13
Mammoth	"	William H. Stewart	2385 S.	15.41	April 25
Mastadon	"	William H. Stewart	2384 S.	44.90	April 25
Mastadon Fraction	"	William H. Stewart	2388 S.	6.07	April 25
Merrimack	"	J. W. Graham, G. Wilson, Fridolph Werner, and R. Graham	1851 S.	46.00	Sept. 9
Monitor	"	J. W. Graham, G. Wilson, Fridolph Werner, and R. Graham	1852 S.	39.40	Sept. 9
Pan	"	William H. Stewart	2387 S.	23.16	April 25
Portal No. 1	"	Christian M. Tobiassen, Burt J. Averill, and John S. Boyce	1648 S.	33.00	Mar. 1
Rabbitt	"	Christian Mayer Tobiassen and Burt Jerome Averill	1647 S.	25.50	Mar. 1
Rock Candy No. 1	"	Christian M. Tobiassen, Burt J. Averill, and John S. Boyce	1646 S.	45.10	Mar. 1
Tadanac	"	Consolidated Mining & Smelting Co. of Canada, Ltd	1649 S.	41.20	Feb. 20
Monday	Greenwood	Hugh McCutcheon	3335	39.76	Aug. 14
Sunday	"	Peter Hay McCurrach	3334	32.10	Aug. 14
Toney Fraction	"	James Henry Goodeve	1907 S.	34.87	Mar. 13
Golden Eagle	Kamloops	John B. MacKenzie	1882 G. 1	16.46	May 28
Exchange Fraction	Lillooet	Coronation Mines, Ltd	673 G. 1	21.85	May 28
Casino No. 1 Fraction	Similkameen	Canada Copper Corporation	2270 S.	17.60	Oct. 11
Fissure Maiden No. 2	"	Inland Development Co., Ltd	3779 G. 1	29.68	Nov. 24
Helena [Fractional	"	Canada Copper Corporation, Ltd	2288 S.	23.24	Sept. 25
Jumper	"	" "	2289 S.	36.11	Sept. 25
Leon	"	" "	2281 S.	27.70	July 7
Michigan	"	" "	2285 S.	33.63	Sept. 25
Mother Lode	"	" "	2290 S.	21.33	Oct. 11
Princess Dorthia No. 1	"	" "	2282 S.	44.06	July 11
Princess Louise	"	" "	2273 S.	51.65	July 17
Wisconsin [stone	"	" "	2283 S.	46.04	Sept. 25
Thomas William Glad-	Vernon	Robert John Hogg	1002 S.	51.65	May 28

VANCOUVER ISLAND AND COAST.

Claim.	Division.	Grantee.	Lot.	Acres.	Date.
Bobby Burns	Nanaimo	Oliver E. Bolger	201A	43.34	Sept. 10
Butterfly	"	Henry Twidle	1123	51.65	Mar. 17
Daniel Webster	"	Percy N. Anderson	203A	28.70	Aug. 14
Golden Era	"	Hugh A. McMillan	104	44.00	Oct. 17
Hetty Green	"	Percy N. Anderson	202A	35.33	Aug. 14
R.A.M.	"	William McDonald	147	48.40	Feb. 19
Retriever	"	William H. Lee	150	38.34	Feb. 7
Trilby	"	Polly Fox	998	50.71	Dec. 8
West Gate Fraction	"	William H. Lee	148	7.46	Mar. 7
Blue Bird No. 1	Quatsino	William Edward Anderson	1538	45.16	Feb. 7
Blue Bird No. 2	"	Jane Richmond Halliday	1539	38.18	Feb. 7
Blue Bird No. 3 Fraction	"	H. A. Titcomb, Executor of estate of F. Brignall, deceased	1542	43.90	July 10
Hemlock	"	Jane Cook	1536	25.15	Feb. 7
Merry Widow No. 2	"	William Edward Anderson	1530	51.48	April 15
Merry Widow No. 3	"	William May Halliday	1540	29.65	April 15
Merry Widow No. 4	"	William Alfred Cook	1541	32.59	May 28
Merry Widow No. 5	"	William James Vaughan	1533	51.48	May 28
Merry Widow No. 6	"	William May Halliday	1534	35.98	April 15
Penstock Fraction	"	Coast Copper Co.	1471	37.50	July 10
Skookum	"	Coast Copper Co.	1475	35.62	July 10
Snow Line	"	Arthur William Corker	1535	33.15	Feb. 7
Whiskers Fraction	"	Coast Copper Co.	1474	26.83	July 10
Young Sports No. 1	"	George Gustavas Hawkins	1531	17.33	July 10
Anvil Fraction	Vancouver	Britannia Mining & Smelting Co., Ltd.	4768	47.30	July 7
Baramba	"	" "	4581 G. 1	51.54	May 10
Beach Fraction	"	" "	4579 G. 1	37.03	May 10
Beaver	"	" "	2128 G. 1	44.54	May 28
Bee	"	" "	4048 G. 1	18.47	Aug. 14
Bee	"	" "	2129 G. 1	47.69	May 28
Black Fraction	"	" "	4230 G. 1	48.49	May 29
Blue Bird	"	" "	4043 G. 1	16.44	Aug. 14
Brown Fraction	"	" "	4403 G. 1	44.94	June 26
B. V. Annex	"	" "	4226 G. 1	51.24	May 29
Cascades	"	Lynn Creek Zinc Mines, Ltd.	3752 G. 1	50.81	Sept. 17
Clipper Fraction	"	Britannnia Mining & Smelting Co., Ltd.	3588 G. 1	51.19	June 26
Crescent	"	Robert Bruce Kirk	4965 G. 1	36.64	July 11
Drury Fraction	"	Britannia Mining & Smelting Co., Ltd.	4769 G. 1	46.75	July 7
Evening Star	"	John Wilson Thornton	4964 G. 1	40.48	July 11
Fleming	"	Lynn Creek Zinc Mines, Ltd.	4025 G. 1	50.15	Sept. 17
Goose Fraction	"	Britannia Mining & Smelting Co., Ltd.	4401 G. 1	48.06	July 7
Gower Fraction	"	" "	4764 G. 1	50.42	July 7
Green	"	" "	4404 G. 1	50.99	June 26
Grey Fraction	"	" "	2902 G. 1	49.00	May 28
Ironsides Fractional	"	" "	4576 G. 1	49.74	Nov. 24
Jack	"	" "	3833 G. 1	51.65	Aug. 14
Jane	"	" "	3831 G. 1	48.98	Aug. 14
Jersey Fractional	"	Lynn Creek Zinc Mines, Ltd.	3749 G. 1	51.53	Sept. 17
Joe	"	Britannia Mining & Smelting Co., Ltd.	3830 G. 1	51.65	Aug. 14
Keats Fractional	"	" "	4771 G. 1	50.93	July 7
Lake Fraction	"	" "	4406 G. 1	50.80	June 26
Loyd Fraction	"	" "	4966 G. 1	45.69	Aug. 14
Lynn Fraction	"	Lynn Creek Zinc Mines, Ltd.	3750 G. 1	5.40	Sept. 17
Mask	"	Britannia Mining & Smelting Co., Ltd.	4644 G. 1	51.65	May 10
Mercer	"	" "	4582 G. 1	50.81	May 10
Moon Fraction	"	" "	2125 G. 1	38.20	May 28
Nalau Fraction	"	" "	4789 G. 1	49.03	July 7
Nigel Fraction	"	" "	4777 G. 1	44.12	July 7
Numas	"	" "	4790 G. 1	51.65	July 7
No. 100	"	" "	4239 G. 1	42.97	June 25
No. 101	"	" "	4240 G. 1	42.97	June 25
No. 102	"	" "	4259 G. 1	51.62	June 25
No. 105 Fraction	"	" "	4242 G. 1	50.86	June 25
No. 106	"	" "	4241 G. 1	51.62	June 25
No. 107	"	" "	2127 G. 1	37.19	May 28
No. 108 Fraction	"	" "	4234 G. 1	51.44	June 25
No. 110	"	" "	4228 G. 1	51.65	May 29
No. 131	"	" "	4243 G. 1	51.50	June 25
Old Ironsides	"	" "	4396 G. 1	51.65	Nov. 24
Old Ironsides No. 1	"	" "	4393 G. 1	51.65	Nov. 24
Old Ironsides No. 2	"	" "	4395 G. 1	43.50	Nov. 24
Old Ironsides No. 3	"	" "	4394 G 1	33.95	Nov. 24
Onyx Fraction	"	" "	4856 G. 1	49.49	Jan. 29
Opal	"	" "	4878 G. 1	51.65	Jan. 29
Pretty Bess	"	Lynn Creek Zinc Mines, Ltd.	4026 G. 1	31.00	Sept. 17
Reo Fraction	"	Britannia Mining & Smelting Co., Ltd.	4983 G. 1	44.08	Aug. 14
Robert Fraction	"	" "	2928 G. 1	49.61	May 28
Ruby Fraction	"	" "	4877 G. 1	47.61	Jan. 29
Russel	"	Lynn Creek Zinc Mines, Ltd.	3748 G. 1	50.73	Sept. 25
Shoal	"	Britannia Mining & Smelting Co., Ltd.	4770	51.65	July 7
Stave	"	" "	4405	50.26	June 26
Sun Fraction	"	" "	2905	50.95	May 28
Swiss	"	" "	4646	51.25	May 10
Tom	"	" "	3832 G. 1	51.65	Aug. 14
White	"	" "	4402 G. 1	35.49	June 25
Will Fraction	"	" "	4860 G. 1	44.33	June 26
Ypres Fraction	"	" "	4407 G. 1	45.53	June 26
Zayas	"	" "	4775	51.06	July 7
Copper King	Victoria	William H. R. Collister and J. R. Collister	139	51.65	Dec. 5
Copper King Fraction	"	" "	155	8.23	Dec. 5
Eureka	"	" "	140	42.60	Dec. 5
Margaret	"	" "	138	51.60	Dec. 5

DEPARTMENT OF MINES.

VICTORIA, B.C.

Hon. WM. SLOAN, *Minister of Mines.*

R. F. TOLMIE, *Deputy Minister.*

WM. FLEET ROBERTSON, *Provincial Mineralogist and Assayer.*

GEO. WILKINSON, *Chief Inspector of Mines.*

HENRY DEVLIN, *District Inspector*, Nanaimo.

JOHN NEWTON, *District Inspector*, Nanaimo.

ROBERT STRACHAN, *District Inspector*, Fernie.

WM. LANCASTER, *District Inspector*, Fernie.

JAMES MCGREGOR, *District Inspector*, Nelson.

THOS. J. SHENTON, *District Inspector*, Prince Rupert.

H. H. JOHNSTONE, *Temporary Inspector*, Nelson.

D. E. WHITTAKER, *Provincial Analyst and Assistant Assayer.*

J. D. GALLOWAY, *Resident Engineer*, Hazelton.

W. M. BREWER, *Resident Engineer*, Nanaimo.

GEO. A. CLOTHIER, *Resident Engineer*, Prince Rupert.

P. B. FREELAND, *Resident Engineer*, Grand Forks.

A. G. LANGLEY, *Resident Engineer*, Revelstoke.

R. W. THOMSON, *Resident Engineer*, Kamloops.

GOLD COMMISSIONERS AND MINING RECORDERS.

Mining Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Atlin Mining Division	Atlin	J. A. Fraser	W. G. Paxton	
Sub-office	Telegraph Creek			H. W. Dodd.
"	Haines (U.S.)		(Com. for taking Affidavits)	Risdon M. Odell.
Stikine Mining Division	Telegraph Creek	H. W. Dodd	H. W. Dodd	
Sub-office	Boundary	"	"	John Cargill.
Liard Mining Division	Telegraph Creek	"	"	
Sub-office	Porter			Chas. H. Smith.
"	McDame Creek			Mike Larsen.
"	Fort St. John			F. W. Beatton.
Skeena Mining Division	Prince Rupert	J. H. McMullin	J. H. McMullin	
Sub-office	Alice Arm			Telka Carney.
"	Kitimat			Rev. S. S. Peat.
"	Port Simpson			J. R. C. Deane.
"	Copper City			P. R. Skinner.
"	Terrace			T. J. Kirkpatrick.
"	Stewart (Portland Canal)			P. S. Jack.
Nass River	Anyox	J. H. McMullin	H. Andrew	
Portland Canal M.D.	Stewart	J. H. McMullin (at Prince Rupert)	P. S. Jack	
Bella Coola Mining Div.	Prince Rupert	J. H. McMullin	J. H. McMullin	Brynild Brynildsen.
Sub-office	Bella Coola			
"	Bella Bella			John A. Pauline.
"	Ocean Falls			A. H. Mogridge.
Queen Charlotte Min'g D.	Queen Charlotte	J. H. McMullin	John L. Barge	
Sub-office	Jedway			Isaac Thompson.
"	Masset			C. Harrison.
"	Lockeport			William Morgan.
Omineca Mining Division	Smithers	Stephen H. Hoskins	Jas. E. Kirby	
Sub-office	Fort Grahame			Einar Ursino.
"	Fort St. James			Alex. C. Murray.
"	Manson Creek			W. B. Steele.
"	Telkwa			T. J. Thorp.
"	Fort St. John			F. W. Beatton.

GOLD COMMISSIONERS AND MINING RECORDERS—*Continued.*

Mining Divisions.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Omineca M.D.—*Con.*				
Sub-office	Copper City			P. R. Skinner.
"	Terrace			T. J. Kirkpatrick.
"	New Hazelton			L. B. Warner.
"	Fort Fraser			Fred Fraser.
"	Junction Finlay &	Parsnip rivers		Henry Stege.
"	Pacific			T. H. McCubbin.
"	Hazelton			Sperry Cline.
"	Burns Lake			R. C. Macdonald.
"	Houston			
"	Usk			Jas. L. Bethurum.
Peace River Mining Div.	Fort St. John	S. H. Hoskins	F. W. Beatton	
Sub-office	Hudson Hope	(at Hazelton)		John Gregg.
"	Pouce Coupe			G. J. Duncan.
Cariboo Mining Division	Barkerville	L. A. Dodd		
Sub-office	Quesnel	"		E. C. Lunn.
"	Fort George	"		T. W. Herne.
"	McBride	"		Thos. Van Dyk.
Quesnel Mining Division	150-Mile House	L. A. Dodd	R. M. McGusty	Hy. J. McDougal.
Sub-office	Quesnel	(at Barkerville)		E. C. Lunn.
"	Quesnel Forks			Wm. Lowden.
"	Barkerville			L. A. Dodd.
Clinton Mining Division	Clinton	Geo. Milburn		
Lillooet Mining Division	Lillooet	John Dunlop	John Dunlop	
Kamloops Mining Division	Kamloops	E. Fisher	L. S. Brown	
Sub-office	Chu Chua			George Fennell.
"	Vavenby			Hyde Finley.
"	Albas			C. O. Sjouquist.
Ashcroft Mining Division.	Ashcroft	E. Fisher (at Kam.)	H. P. Christie	
Sub-office	Lytton			Thos. Somerville.
Nicola Mining Division	Merritt	E. Fisher (at Kam.)	J. A. Murchison	
Yale Mining Division	Yale	" "	H. Beech	
Sub-office	Hope	" "		Wm. Greenwood.
Similkameen Mining Div.	Princeton	Hugh Hunter	Hugh Hunter	
Sub-office	Hedley			T. H. Rotherham.
Vernon Mining Division	Vernon	L. Norris	H. F. Wilmot	
Greenwood Mining Div.	Greenwood	W. R. Dewdney	W. R. Dewdney	
Sub-office	Vernon			H. F. Wilmot.
"	Rock Creek			S. T. Larsen.
"	Beaverdell			E. F. Ketchum.
Grand Forks Min. Div.	Grand Forks	S. R. Almond	S. R. Almond	
Osoyoos Mining Division	Fairview	J. R. Brown		
Sub-office	Olalla			R. W. Northey.
"	Hedley			T. H. Rotherham.
Golden Mining Division	Golden	John Bulman	G. E. Sanborn	
Windermere Mining Div.	Wilmer	" (at Golden)	E. M. Sandilands	
Fort Steele Mining Div.	Cranbrook	N. S. A. Wallinger.		
Sub-office	Steele			Joseph Walsh.
"	Fernie			R. J. Stenson.
"	Moyie			W. H. Laird.
"				
Ainsworth Mining Div	Kaslo	Ronald Hewat.	A. McQueen	A. W. Anderson.

GOLD COMMISSIONERS AND MINING RECORDERS—*Continued.*

Mining Division.	Location of Office.	Gold Commissioner.	Mining Recorder.	Sub-Recorder.
Ainsworth M.D.—*Con.*				
Sub-office	Howser			W. Simpson.
"	Trout Lake			Oscar Jacobson.
"	Crawford Bay			Thos. W. Lytle.
"	Poplar			Arthur G. Johnston.
Slocan Mining Division	New Denver	Ronald Hewat	Angus McInnes	
Sub-office	Sandon	(at Kaslo)		W. J. Parham.
Slocan City Mining Div.	Slocan	Ronald Hewat	Thos. McNeish	
Trout Lake Mining Div.	Trout Lake	"	Oscar Jacobson	
Nelson Mining Division	Nelson	E. Ferguson (Actg.)	S. S. Jarvis	
Sub-office	Creston			R. Lamont.
"	Ymir			Wm. Dowling.
"	Sheep Creek			Geo. Leece.
"	Salmo			M. C. Donaldson.
Arrow Lake Min. Division	Nakusp	E. Ferguson	Walter Scott	
Sub-office	Vernon	(at Nelson)		H. F. Wilmot.
Revelstoke Mining Div.	Revelstoke	A. Johnson	J. Lee	Newton R. Brown.
Lardeau Mining Division	Beaton	" (at Revelstoke)	Frances I. Fraser	
Trail Creek Mining Div.	Rossland	H. R. Townsend	M. S. Morrell	
Nanaimo Mining Division	Nanaimo	S. McB. Smith	S. McB. Smith	
Sub-office	Ladysmith			John Stewart.
"	Alert Bay			Ernest H. Robinson
"	Vananda			Leonard Raper.
"	Quathiaski Cove			S. Marshall.
"	Granite Bay			Henry Twidle.
"	Campbell River			T. W. Hanson.
Alberni Mining Division	Alberni	A. G. Freeze	A. G. Freeze	
Clayoquot Mining Division	Clayoquot	" (at Alberni)	W. T. Dawley	
Quatsino Mining Division	Quatsino	" "	Ed. Evensen	
Victoria Mining Division	Victoria	Herbert Stanton	Herbert Stanton	
New Westminster Min. D.	New Westminster	F. C. Campbell	I. Wintemute	
Sub-office	Harrison Lake			L. A. Agassiz.
"	Chilliwack			J. Pelly.
Vancouver Mining Div.	Vancouver	John Mahony	A. P. Grant	

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Annual Report of the Minister of Mines for the year ending 31st December, 1919, being an account of mining operations for gold, coal, etc., in the Province. William Fleet Robertson, Provincial Mineralogist. 393 pp., plates, maps, 1919.
Victoria, Government Printing Office, 1920.

Author.

Robertson, William Fleet. *(Provincial Mineralogist.)*

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ANNUAL REPORT

OF

THE PROVINCIAL GAME WARDEN

OF THE

PROVINCE OF BRITISH COLUMBIA

1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable Edward Gawler Prior,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

May it please Your Honour:

The undersigned has the honour to present the Report of Provincial Game Warden for the year ending December 31st, 1919.

J. W. de B. FARRIS,

Attorney-General.

Attorney-General's Department,

Victoria, B.C., February 17th, 1920.

PROVINCIAL GAME WARDEN'S OFFICE,
VICTORIA, B.C., January 31st, 1920.

Honourable J. W. de B. Farris, K.C., M.P.P.,
Attorney-General, Victoria, B.C.

SIR,—I have the honour to submit herewith my Report for the year which ended December 31st, 1919.

I have the honour to be,
Sir,
Your obedient servant,

WM. G. McMYNN,
Provincial Game Warden.

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REPORT FOR THE YEAR 1919.

SUMMARY.

The Superintendent of Provincial Police being ex-officio Provincial Game Warden of the Province, and all Provincial constables being Game Wardens under the "Game Act," the enforcement of the "Game Act" during the year 1919 has been carried out by the Provincial Police as a part of their regular duties.

I am glad to report that the revenue from game licences during the year 1919 has been the greatest in any year since the organization of the Game Department, reaching a total of $116,135, and that the total number of convictions for infractions of the "Game Act" numbered 235, being 138 more than in the year 1917.

The duties of the Provincial Police are extremely varied. These duties include, in addition to the general policing of the whole Province, the work of Sanitary Inspectors for the Health Department (in connection with which work 282 written reports were made during the year); Weed Inspectors and Brand Inspectors for the Agriculture Department (the latter inspections frequently necessitating special trips at all seasons and hours to avoid delaying the shipment of cattle); making investigations for the Prohibition Commissioner, as well as collecting about half a million dollars in revenue for the Finance Department during the year under the "Game Act," the "Motor-traffic Regulation Act," the "Amusements Tax Act," the "Sheep Protection Act," the "Trade Licences Act," the "Pool-rooms Act," and the "Poll-tax Act"; reporting on fires for the Fire Insurance Department, etc. As all of these duties are carried out simultaneously with the enforcement of the "Game Act" and other Provincial Acts, it is practically impossible to segregate expenses incurred in the carrying-out of these different duties and charge them to the department for whom such services have been performed.

On this account all expenses which have been incurred in the enforcement of the "Game Act" during the present fiscal year, other than those included in Appendix B, page 13, of this report, have been charged directly to the general police vote.

I approve of these ever-increasing duties being taken over by the Provincial Police, as this policy is undoubtedly an economical one for the Government, although it also means a slightly increased number of Provincial Police officers being employed to take care of the very much increased volume of work.

The present Provincial Police Force consists of about 145 officers, who are Game Wardens, and during the last open game season about fifteen additional special constables were employed for game-protection purposes. This number, however, compares very favourably with conditions in 1917, when there were separate staffs of Provincial Police, Game Wardens, Brand Inspectors, Weed Inspectors, etc., in these different departments.

The success in the administration of the "Game Act" by the Provincial Police during the year 1919 is more marked than in any previous year, and in this regard the following table giving a comparison of statistics for the years 1917, 1918, and 1919 is interesting:—

Calendar Year.	Informations laid.	Convictions	Suspended Sentences.	Cases withdrawn.	Cases dismissed.	Firearms confiscated.	Fines imposed.	Revenue derived from sale of Game Licences.
1917	111	97	..	4	10	..	$1,763 50	$ 65,487 50
1918	194	159	8	9	13	5	3,341 00	75,537 00
1919	267	235	7	..	25	36	6,024 50	116,135 00

In Appendix D, page 22, of this report is given a list of Provincial Police officers as of December 31st, 1919, together with an analysis of the sources of revenue derived from the sale of game licences for the year 1919.

CONVICTIONS UNDER THE "GAME ACT."

A detailed statement in tabular form of the 235 convictions which were obtained for infringements of the "Game Act" is shown in Appendix C, page 18, of this report. The following cases are of particular interest:—

Poaching.—There has always been considerable difficulty in the enforcement of the "Game Act" in the easterly and south-easterly portions of the Province, where, owing to the direction of the watercourses and other topographical conditions, access is more readily obtained from Alberta and the United States than from passes in the Province of British Columbia.

In order to counteract illegal trapping in these outlying sections it was necessary in March last for Deputy Inspector Owen, of Fernie, to organize an expedition into the Flathead country. Through Mr. Benjamin Lawton, Chief Game Guardian of Alberta, the co-operation of the Alberta Game Department was secured, and their representatives, Messrs. Riviere and Bowers, together with Mr. F. E. Maunders, Superintendent of the Dominion Parks Branch, Waterton Park, Alberta, rendered every possible assistance in making the expedition a success.

This trip was very successful, resulting in eight convictions, together with the confiscation of two revolvers, three rifles, 540 rounds of ammunition, fifty-three traps, three marten-skins, seven weasel-skins, and one goat-skin.

These convictions have had a most discouraging effect upon poachers in that section, and Deputy Inspector Owen deserves credit for his energetic action therein.

Running Deer with Dogs.—On informations laid by Provincial Constable John A. Hird, of the police boat "Watla," John McKee, Esq., Police Magistrate at Ladner, on November 27th last, convicted six men of unlawfully hunting deer with dogs on November 23rd near Ladner. Five of these men were each fined $100 and costs and the sixth man was fined $50 and costs. Three rifles and two shotguns which were found in possession of these men were confiscated.

Pit-lamping.—Pit-lamping is one of the most difficult offences about which to secure sufficient evidence to justify a conviction under the "Game Act." On November 15th last four well-known men of Cumberland were convicted by C. H. Bevor-Potts, Esq., Stipendiary Magistrate of Nanaimo, on information laid by Provincial Constables H. B. Dawley and G. A. Mortimer, of being unlawfully in possession of firearms and head-lights near Union Bay during the night of November 15th, 1919. The accused were each sentenced to sixty days' imprisonment in the Oakalla Prison Farm, and two rifles and two shotguns found in possession of these men were confiscated.

ACCIDENTS DUE TO CARELESS HANDLING OF FIREARMS.

I regret to report that during the year 1919, owing to the careless handling of firearms, nine men were killed and twelve were injured.

Cause.	Killed.	Injured.
Mistaken for a moose	1	..
Mistaken for a deer	2	1
Shot by grouse-hunter	1	..
Other accidental discharges of firearms	5	11

In the case of the killing of Herbert Blakely on December 17th last by Pierre Legace in mistake for a deer, Legace has been committed for trial on the charge of manslaughter, and his case will come up for trial at the next spring assizes.

Further particulars of these hunting accidents are shown in Appendix C, page 18, of this report.

GAME ASSOCIATIONS.

The game laws are primarily intended to afford protection to the game, fur-bearing animals, and other wild life within the Province, and if we are to continue to enjoy them the "Game Act" and other enabling Acts must be strictly enforced.

Every good citizen should be willing to aid the Game Wardens in the carrying-out of their work and to give them at all times any necessary information within their power to prosecute the man who illegally hunts out of season, the pit-lamper, and the game-hog.

The Department is therefore particularly anxious to secure the full support of the public in the enforcement of the "Game Act." With this end in view and with the energetic co-operation of Dr. A. R. Baker and Mr. R. E. Hose, respectively Chairman and Secretary of the Game Con-

servation Board, no less than fifteen new game associations have been formed throughout the Province. A list of all the game associations in the Province is shown in Appendix D, page 22, of this report.

Regulations and Bounties.

During the year very little money was paid out by the Department in the form of bounties. This was due to the bounty regulations stipulating that all coyote-pelts had to be surrendered to the Government in order to collect the bounty thereon, and the present high price of furs made it more profitable to sell most of the pelts obtained to the fur-buyers.

As wolves and panthers appear to be rapidly increasing in some parts of the Province, the bounty for the destruction of these animals was increased on September 1st, 1919, from $10 to $15 on each mature wolf killed and from $15 to $25 on each mature panther killed within the Province. Bounties are also paid for the killing of the young of these animals at half of the above rates.

In the Game Regulations, 1919, a synopsis of which is given in Appendix F, page 28, of this report, no open season is allowed on beaver throughout the Province. This step was deemed necessary on account of the rapidly decreasing numbers of these important fur-bearing animals. In this connection the following notice was published in the British Columbia Gazette, as well as widely distributed throughout the Province by the police, as a preliminary step to the enforcement of a close season:—

Notice re Beaver under Section 33 of the "Game Act."

As the Game Regulations of 1919 do not provide any open season for beaver, no person shall now have in his possession within the Province of British Columbia any part of any beaver or any undressed beaver-pelts without the permission in writing of the Provincial Game Warden, and the burden of proof as to the time of killing or taking of any such beaver shall be upon the person found in possession thereof.

Any person who now believes that he is rightfully in possession of any undressed beaver-pelt in the Province of British Columbia should forthwith furnish particulars thereof to the Provincial Game Warden and apply to him for a permit to legally retain possession of the same.

Wm. G. McMynn,
Provincial Game Warden.

Victoria, B.C.,
November 20th, 1919.

There was also instituted a system by which every undressed beaver-pelt legally in possession might be numbered and marked for identification by a representative of this Department.

Pheasant-farm at Colquitz.

Very satisfactory results were obtained at the Provincial Government pheasant-farm at Colquitz during the year 1919 by Provincial Constable A. P. Cummins.

In this period 91 old pheasants and 1,225 young pheasants were distributed in different parts of the Province. One hundred young pheasants were added to the stock of the farm. The details of the operations are shown in Mr. Cummins's statement which is printed on page 27 of this report.

Fur-farming.

During the year all permits which were issued to applicants for the purpose of fur-farming were made to terminate at the end of the current year, and applications for renewals of such permits were required to be made on the following form. The object of this is twofold—first to secure reliable information regarding the results being obtained by fur-farmers in the Province, and also an undertaking from all fur-farmers that the flesh of game animals or birds will not be used in the business of fur-farming. Whenever these conditions have been complied with permits have been renewed.

In the Matter of the "Game Act," and in the Matter of Fur-farming under said Act.

The undersigned hereby makes application to the Provincial Game Warden at Victoria, B.C., for a renewal of Permit No. for the year ending December 31st, 19 , and in support thereof now gives full and correct answers to the following questions, namely:—

1. Official description of the farm on which a fur-farming business is now carried on under said Permit No. , with the name and address of owner of said farm .

2. Particulars of pens, buildings, and other facilities now on said farm and used in said business, with values thereof respectively .

3. Number and description of fur-bearing animals now on said farm, where and when obtained, and individual values thereof .

4. Gross proceeds of the business during 1919, with detailed particulars how such proceeds were obtained .

5. To the date hereof, has the flesh of any game animals or birds been fed to any fur-bearing animals on the said farm during the current year?

6. Does the applicant now hereby undertake that the flesh of game animals or birds will not be fed to any fur-bearing animals on said farm if this application for renewal of Permit No. is granted?

In testimony whereof the said applicant has hereunto set his hand this day of 19 , at , B.C.

.....

(Signature of Applicant in full.)

A list of fur-farms, showing particulars of animals in captivity as of August 1st, 1919, is shown in Appendix E, page 27, of this report.

Immediately following will be found interesting reports by Dr. A. R. Baker, Chairman, and Messrs. F. H. Mobley and F. A. Dunn, members of the Game Conservation Board. These reports deal concisely with the game conditions in the different sections of the Province which have come particularly under their observation during the past year.

APPENDICES TO GAME REPORT.

APPENDIX A.

REPORTS OF MEMBERS OF THE GAME CONSERVATION BOARD.

Report of Dr. A. R. Baker, Chairman of the Game Conservation Board.

Grouse.—During the open season for grouse on the Mainland from September 13th to September 28th, 1919, I visited nearly all that territory lying to the south of the Fraser River, from the Delta to the Chilliwack District, and found that willow-grouse were not very plentiful, except in small areas, principally that portion of Chilliwack District that is traversed by the Vedder River from its source (Kultus Lake) to Sumas Lake. There were very few willow-grouse to be found elsewhere, and from my observation it would be well if these birds were protected for a year or more in order that they may be allowed to increase.

I also visited nearly all sections north of the Fraser River, including Nicomen Island, Hatzic Prairie, and Pitt Meadows District. In these districts I found willow-grouse to be more plentiful, and also found that there were considerable number of blue grouse, although not in sufficient quantities to warrant any long open season.

Pheasants.—During the open season I visited all those parts of the Fraser Valley where pheasants are found, also Saanich, Duncan, and Saltspring Island, and at that time from reports received from hunters it would have appeared that these birds were scarce.

I have investigated since the closing of the season, and find that the pheasants are quite plentiful; in fact, very much more so than they were at this season a year ago, especially in Surrey and Chilliwack and also on Saltspring Island.

The apparent scarcity during the open season, to my mind, was due to the increased number of hunters who were out continually, causing the birds to seek cover in the wooded districts instead of feeding in the fields, as they do when they are not disturbed too much.

I find that there is not a shortage of hen pheasants; in fact, I consider that there are too many for the proper proportion for breeding purposes.

Migratory Birds (Ducks, Geese, Brant, Snipe, etc.).—To my mind this has been the best season for these birds that we have had for several years, as they have been very plentiful throughout the entire valley of the Fraser.

The opening of the season at a later date as we did this year has shown quite conclusively that the local-bred birds do not leave for the south until after they have been disturbed on their resting-grounds, which proves to my mind that some action should be taken to provide for migratory-bird sanctuaries, so that the Fraser Valley will become the breeding-grounds for large quantities of ducks, snipe, etc.

Deer.—Deer have been quite plentiful on the portions of the Lower Mainland, also on many of the Gulf Islands; our chief difficulty being lack of adequate means for the prevention of the use of dogs and pit-lamps.

Noxious Animals.—There seems to be quite a migration of coyotes into the Fraser Valley this year; in fact, we find these animals in places where they have not been seen for years previously in the eastern portion of the Chilliwack District and Agassiz. In fact, coyotes have formed a great amount of destruction among our game birds in all that territory adjacent to Rosedale, and at this season of the year some provision should be made for their destruction by the constables of their districts.

That portion of the Chilliwack District known as the Camp Slough, and surrounding territory, two years ago was one of the best pheasant territories. I am sorry to report that owing to the coyotes there are very few of these birds left, and if some means are not employed for their destruction they will probably be exterminated before the next breeding season.

Cats.—Domestic cats that are abandoned by the campers and logging camps are one of the worst pests we have in this section of the country, and although there is nothing on the Statutes giving us the right to destroy these animals, something should be done in this matter in order to protect the birds.

Crows.—The bounty provided for by Order in Council last spring has to my mind been very beneficial, although I do not believe that there has been a very large amount of money expended on bounties, but the fact being known that it was the desire of the authorities to try to do away with these pests has been a great inducement to the hunters to destroy them, and a great many have been killed for which no bounty has been asked.

Quail.—About a year ago we liberated quail from Vancouver Island and the highlands back of North Vancouver at Oakalla Farm and in Point Grey, and am pleased to inform you that these birds have done remarkably well. It is my intention to liberate as many of these birds as possible in the higher lands around Vancouver this spring, also some at Agassiz, where I believe they will do well.

The pheasants shipped here from the pheasant-farm in Victoria were liberated at various points—namly, Chilliwack, Delta, Lulu Island, Pitt Meadows, Nicomen Island, Matsqui, North Vancouver, and also a few on the Gulf Islands. From all reports they have been beneficial in improving the stock already there.

REPORT OF MR. F. H. MOBLEY, M.P.P., MEMBER OF GAME CONSERVATION BOARD.

The big-game conditions throughout the northern part of the Province are about as follows:—

Moose.—Moose are on the increase and are more plentiful, both in the Atlin country and along the line of the Grand Trunk Pacific Railway, including all the country north of the Cariboo, than they have been for years.

Caribou.—Caribou are very scarce, and with the exception of the section in the vicinity of the head of the Stikine River, very few are to be found.

Sheep.—Sheep are exceedingly scarce throughout the whole of the north.

Deer.—Deer on the Coast are more plentiful than they have been for years past, and they are in much better condition than usual owing to pasturage conditions.

Bear.—Bear are about holding their own, which I consider good in view of the large number that are being taken in some sections.

Game Birds.—Geese, ducks, and in fact all water-fowl are about as they were last year.

Grouse.—Both willow and Franklin grouse are much more numerous than they have been for some time all along the Coast; blue grouse are scarce both on the Coast and in the Interior. Ptarmigan are slowly coming back, but are scarce yet.

Fur-bearing Animals.—Fur-bearing animals are none too plentiful in any section, but owing to the extremely high price being paid for furs I anticipate a big catch.

REPORT OF MR. F. A. DUNN, MEMBER OF GAME CONSERVATION BOARD.

Following is the report of investigating tour from Windermere, B.C., through Taggart's Pass, crossing the Kootenay, Palliser, White River, Fenwick, Blackfoot, White Tail, and Mud Creeks, to Sheep Creek:—

August 14th, 1919. Sent Special Constable E. A. Powers to Windermere to round up horses and shipped provisions and tent by freight.

August 17th. Special Constable Grangers took his horses from Canal Flats to Windermere.

August 18th. I went to Windermere by motor-car with camping outfit, blankets, etc.; ninety miles.

August 19th. Chief Fire Ranger Geo. Watson assigned Fire Warden Oscar Eckstrum to go with our party as he was familiar with the trails, as it was in his territory. Left Windermere at 2 p.m. with four saddle-horses and three pack-horses. Made Twin Lakes for camp about nine miles from Windermere. Saw quite a number of blue and willow grouse, but no big game.

August 20th. Started from Twin Lakes at 8.30 a.m.; went over Taggart's Pass, 4,470 feet elevation; arrived at Gooseberry Meadows about 3 p.m.; distance about twelve miles. Found good camping-place with plenty of feed for the horses; saw one or two white-tail deer and plenty of grouse, also found a moose-trail through the meadow with fresh signs.

August 21st. Left Gooseberry Meadows about 9 a.m.; forded the Kootenay River about forty miles above Canal Flats; went up the Kootenay about twelve miles to Salt Lick; here we found a trapper's cabin recently erected and camped in it. There is a meadow at this point of probably between 200 and 300 acres, with a lake of 20 or 30 acres. The water is very brackish and not fit to use without boiling. Saw a few goat and sheep on the side-hills, but owing to the very smoky condition of the atmosphere from fires burning near Skookumchuck was unable to get

much satisfaction with the glasses. Saw plenty of moose signs, some very large tracks, evidently two or three different bands of from three to five in each band; found two sets of tepee-poles where the Indians had been camped early in the spring, and from the hair and bones which lay around these tepees I am satisfied they had been killing moose or elk. I found that Game Warden Dawson, of Athalmer, had registered at this camp on August 12th.

August 22nd. Left Salt Lick at 8.30 a.m.; crossed the Palliser River, Fenwick and Cedar Creeks, and arrived at White River about 5 p.m., about fifteen miles; saw a few white-tail deer and lots of grouse and fresh bear signs, but could not do any good with the glasses as the smoke was getting worse. We did not break camp the next day as it looked very much like rain, which we hoped would come to clear up the smoke. We were disappointed as no rain came, still very smoky. Caught some very fine trout at this camp from 1 to 1½ lb. Saw plenty of moose signs in this vicinity, a band of at least five having gone up White River, their tracks very plain in the sand along the bank of the river.

August 23rd. In camp at White River.

August 24th. Left White River Camp at 8 a.m. and forded White River; stopped at Blackfoot Creek for lunch; made White Tail Creek at 6.30 p.m., seventeen miles. Jumped several white-tail deer and several coveys of blue and willow grouse, from six to eight in each covey.

August 25th. Left White Tail Creek camp at 8 a.m. for Sheep Creek; crossed the head of Mud Creek, where we took lunch. This was the only day's travel without a trail. We found but very little bad going and had to do some cutting of thick windfalls. Arrived at Sheep Creek about 2 p.m.; thence up Sheep Creek for about three miles; found this trail in bad shape, and owing to the very smoky condition could not see for one-half mile with glasses. I decided that it would be a waste of time to continue on to White Swan Lake, so turned back and camped at Mud Creek. Saw more deer on this day's travel than on any other (eighteen miles).

August 26th. Broke camp at Mud Creek at 8.30 a.m. for Canal Flats; arrived there about 1 p.m., fourteen miles; saw six white-tail deer, several large flocks of mallard ducks on the small lakes along the trail, some golden eagles and porcupines, plenty of grouse. Met Inspector W. L. Fernie at Canal Flats, who was returning from a trip to Golden.

August 27th. Sent Special Constable Powers and Fire Warden Eckstrum to Windermere with horses and came to Cranbrook by auto.

Summary.—There are plenty of deer and grouse of all kinds in that territory, and between the Upper Kootenay and Palliser Rivers several bands of moose, as many as five in one band; did not see any elk or signs of them; it was so smoky could locate but few sheep and goats on the mountains. The trails were located so that specials will be able to patrol that part of the country east of the Kootenay River easily.

APPENDIX B.

FINANCIAL.

Revenue derived from the Sale of Resident Firearms Licences, January 1st, 1919, to May 31st, 1919.

	No.	Amount.
O.F.L.	1,059	$2,647 50
G.F.L.	166	830 00
S.F.L.	356	3,560 00
Guides	1	5 00
F.F.L.	453	.....
P.F.L.	177	.....
Total amount		$7,042 50

Revenue derived from the Sale of Non-resident Firearms and Anglers' Licences, January 1st, 1919, to May 31st, 1919.

	No.	Amount.
Season anglers' licences	20	$ 100 00
Daily anglers' licences	17	17 00
Total amount		$ 117 00

Revenue derived from Sale of Resident Firearms Licences, June 1st, 1919, to December 31st, 1919.

Government Agents.	O.F.L.		G.F.L.		S.F.L.		Guides.		F.F.L.	P.F.L.	Totals.
	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	No.	
Vancouver	4,743	$11,857 50	770	$ 3,850 00	330	$ 3,300 00	..	.....	202	282	$19,007 50
New Westminster	3,045	7,612 50	105	525 00	118	1,180 00	..	.....	514	50	9,317 50
Victoria	3,074	7,685 00	115	575 00	81	810 00	33	$165 00	245	50	9,235 00
South Fort George	113	282 50	311	1,555 00	490	4,900 00	..	.....	106	66	6,737 50
Vernon	1,405	3,512 50	109	545 00	83	830 00	..	.....	205	38	4,887 50
Kamloops	953	2,382 50	127	635 00	174	1,740 00	..	.....	495	104	4,757 50
Nanaimo	1,473	3,682 50	144	720 00	84	340 00	..	.....	25	...	4,742 50
Prince Rupert	524	1,310 00	269	1,345 00	173	1,730 00	..	.....	21	251	4,385 00
Fernie	437	1,092 50	296	1,480 00	66	660 00	..	.....	16	11	3,232 50
Cumberland	800	2,000 00	119	595 00	28	280 00	..	.....	102	...	2,875 00
Nelson	498	1,245 00	150	750 00	78	780 00	..	.....	138	154	2,775 00
Duncan	662	1,655 00	31	155 00	16	160 00	..	.....	180	...	1,970 00
Golden	119	297 50	137	685 00	87	870 00	..	.....	48	17	1,852 50
Cranbrook	324	810 00	88	440 00	45	450 00	..	.....	20	46	1,700 00
Revelstoke	194	485 00	80	400 00	78	780 00	..	.....	44	105	1,665 00
Fairview	451	1,127 50	46	230 00	26	260 00	..	.....	34	9	1,617 50
Smithers	75	187 50	23	115 00	131	1,310 00	..	.....	80	94	1,612 50
Kaslo	149	372 50	85	425 00	76	760 00	2	10 00	45	221	1,567 50
Alberni	342	855 00	58	290 00	38	380 00	..	.....	37	4	1,525 00
150-Mile House	108	270 00	21	105 00	104	1,040 00	..	.....	37	10	1,415 00
Quesnel	82	80 00	27	135 00	93	930 00	6	30 00	60	69	1,175 00
Clinton	134	335 00	20	100 00	72	720 00	..	.....	60	25	1,155 00
Merritt	215	537 50	15	75 00	40	400 00	..	.....	47	29	1,012 50
Fort St. John	6	15 00	12	60 00	92	920 00	..	.....	24	3	995 00
Princeton	204	510 00	45	225 00	22	220 00	..	.....	16	105	955 00
Rossland	233	582 50	65	325 00	3	30 00	..	.....	27	25	937 50
Greenwood	216	540 00	28	140 00	20	200 00	..	.....	71	68	880 00
Grand Forks	189	472 50	36	180 00	14	140 00	..	.....	29	35	792 50
Wilmer	86	215 00	24	120 00	36	360 00	3	15 00	13	11	710 00
Ashcroft	154	385 00	40	200 00	12	120 00	..	.....	3	6	705 00
Lillooet	55	137 50	36	180 00	27	270 00	3	15 00	4	66	602 50
Fort Fraser	18	45 00	...	.....	43	430 00	..	.....	25	2	475 00
Telegraph Creek	...	.....	...	.....	33	330 00	20	100 00	...	...	430 00
Anyox	67	167 50	20	100 00	9	90 00	..	.....	...	32	357 50
Yale	46	115 00	11	55 00	14	140 00	..	.....	4	43	310 00
Atlin	3	7 50	...	.....	26	260 00	..	.....	1	35	267 50
Totals	21,147	$52,867 50	3,463	$17,315 00	2,812	$28,120 00	67	$335 00	2,978	2,066	$98,637 50

Revenue derived from Sale of Non-resident Licences, June 1st, 1919, to December 31st, 1919.

Government Agent.	Big Game.			Spring Bear.		Season Bird.		Weekly Bird.		Season Anglers.		Daily Anglers.		Totals.
	No.	Amount.	Fees.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	No.	Amount.	
Telegraph Creek	23	$ 575 00	$3,380 00	..	...	..	...	..	...	..	...	..	...	$ 3,955 00
Golden	43	1,075 00	410 00	..	...	..	...	..	...	..	...	..	...	1,485 00
Cranbrook	22	550 00	100 00	3	75 00	..	...	..	...	26	$130 00	8	$ 8 00	863 00
Vancouver	20	500 00	170 00	4	100 00	..	...	4	$20 00	29	145 00	..	...	935 00
South Fort George	11	275 00	145 00	5	125 00	..	...	..	...	3	15 00	..	...	560 00
Victoria	6	150 00	100 00	6	150 00	..	...	2	10 00	27	135 00	..	...	545 00
Fernie	9	225 00	80 00	5	125 00	..	...	..	...	18	90 00	6	6 00	526 00
New Westminster	12	300 00	...	..	...	..	...	..	...	3	15 00	13	13 00	328 00
Lillooet	3	75 00	75 00	2	50 00	..	...	..	...	2	10 00	..	...	210 00
Wilmer	4	100 00	105 00	..	...	..	...	..	...	..	...	..	...	205 00
Atlin	1	25 00	130 00	..	...	..	...	..	...	..	...	..	...	155 00
Barkerville (Quesnel)	2	50 00	75 00	1	25 00	..	...	..	...	..	...	..	...	150 00
Revelstoke	2	50 00	50 00	..	...	..	...	..	...	..	...	..	...	100 00
Kaslo	..	...	...	4	100 00	..	...	..	...	..	...	..	...	100 00
Kamloops	..	...	...	..	...	..	...	1	5 00	6	30 00	27	27 00	62 00
Clinton	2	50 00	...	..	...	..	...	..	...	..	...	..	...	50 00
Nanaimo	..	...	...	..	...	..	...	..	...	5	25 00	..	...	25 00
Smithers	1	25 00	...	..	...	..	...	..	...	..	...	..	...	25 00
Greenwood	..	...	...	..	...	..	...	..	...	4	20 00	2	2 00	22 00
Nelson	..	...	...	..	...	..	...	..	...	2	10 00	..	...	10 00
Princeton	..	...	...	..	...	..	...	..	...	2	10 00	..	...	10 00
Alberni	..	...	...	..	...	..	...	..	...	1	5 00	2	2 00	7 00
Grand Forks	..	...	...	..	...	..	...	..	...	1	5 00	..	...	5 00
Fairview	..	...	...	..	...	..	...	..	...	1	5 00	..	...	5 00
Totals	161	$4,025 00	$4,820 00	30	$750 00	..	...	7	$35 00	130	$650 00	58	$58 00	$10,338 00

STATEMENT OF EXPENDITURE FOR PERIOD APRIL 1ST, 1919, TO DECEMBER 31ST, 1919.

Overhead Charges.

Office—			
Salaries	$2,689 98		
Stationery	1,308 62		
Advertising	422 15		
Rent	300 00		
Furnishing and decorating	222 85		
Postage	193 26		
Stenography	115 05		
Telephones	110 74		
Telegrams	78 00		
Janitor	60 80		
Freight and expressage	30 88		
Maps	32 20		
Sundries	23 40		
Light	7 89		
		$5,595 82	
Travelling expenses—			
Chief Game Inspector	$ 451 70		
Inspection of Elk River Reserve	138 36		
Office staff	19 21		
Auto-hire	23 00		
		632 27	
Operating expenses—			
Repairs and upkeep, gasolene and garage-rent of auto used by Chairman	$ 221 03		
Operating expenses of moving pictures	166 80		
		387 83	
Badges—			
Cost of firearms licence badges for 1919-20		819 95	
			$ 7,435 87

Propagation.

Colquitz Game Farm—			
Wages and expenses	$2,287 15		
Feed	1,132 31		
Rent	315 00		
Broody hens	286 75		
Coal	108 14		
Equipment	102 59		
Telephone	28 40		
Light	22 01		
Water	11 20		
Sundries	2 50		
		$4,296 05	
Distribution—			
Freight on birds	$ 45 20		
Feed at Oakalla	35 15		
Feeding pheasants	6 10		
		86 45	
			4,382 50

Game Conservation Board.

Travelling expenses—			
Chairman, expenses to Ottawa	$ 535 75		
Chairman, local	424 91		
		$ 960 66	
Members, local		438 64	
Secretary, local		199 35	
			$ 1,598 65

Equipment purchased.

Purchase price of auto for Chairman	$1,523 00	
Purchase price of moving pictures	694 50	
Purchase price of De Vry projector and accessories	352 40	
		2,569 90

Claims paid.

For damage by liberated elk	20 00
Total expenditure from April 1st, 1919, to Dec. 31st, 1919	$16,006 92

Recapitulation.

Appropriation for fiscal year 1919-20 as per Vote No. 68			$35,000 00
Less—			
Expenditure to December 31st, 1919—			
Overhead charges	$ 7,435 87		
Propagation	4,382 50		
Game Conservation Board	1,598 65		
Equipment	2,569 90		
Claims	20 00		
		$16,006 92	
Bounties paid to December 31st, 1919		2,977 10	
			$18,984 02
Balance on hand			$16,015 98

APPENDIX C.

ENFORCEMENT OF THE "GAME ACT."

PROSECUTIONS (PROVINCIAL POLICE DISTRICTS).

Description of Offence.	Northern.				Central.					Kootenay.			Vanc. Island.							
	Prince Rupert.	Fort St. John.	Hazelton.	Fort George.	Lillooet.	Yale.	Kamloops.	Vernon.	Boundary.	N.E. Kootenay.	S.E. Kootenay.	W. Kootenay.	Vancouver.	Victoria.	Nanaimo.	Dismissals.	Suspended Sentences.	Convictions.	Total No. of Cases.	Fines and Penalties imposed.
Game Animals.																				
Killing caribou during close season	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	$ 250 00
In possession of deer under one year in age	..	..	..	..	..	..	..	1	4	..	2	..	..	..	..	..	..	7	7	330 00
In possession of deer-meat during close season	1	..	..	..	..	..	..	1	..	..	1	3	..	..	1	2	..	7	9	210 00
Killing deer during close season	..	..	..	..	..	..	..	1	..	..	1	4	5	..	..	1	..	11	12	440 00
Killing deer under one year in age (fawns)	..	..	..	..	..	..	..	..	1	..	..	..	1	..	..	1	..	2	3	150 00
Running deer with dogs	..	..	..	..	..	..	..	..	..	..	..	..	8	..	..	3	..	8	11	700 00
Having deer-meat on premises of a logging camp or boarding-house	..	..	..	..	..	..	..	..	..	..	..	..	3	1	..	..	..	4	4	240 00
Killing bear without a licence	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	..	1	1	25 00
Killing bear during close season	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	.. ..
Possession of game during close season	1	..	1	..	..	..	..	2	..	..	..	1	..	..	..	..	..	5	5	110 00
Unlawful sale of deer-meat	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	5 00
Game Birds.																				
Killing willow-grouse during close season	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	25 00
Possession of blue grouse during close season	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	2	30 00
Killing grouse during close season	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	2	2	50 00
Possession of grouse during close season	..	..	..	..	..	..	..	..	..	..	..	..	3	3	1	..	..	7	7	360 00
Possession of pheasants during close season	..	..	..	..	..	..	..	1	..	..	..	..	..	1	..	1	..	2	3	35 00
Possession of hen pheasants during close season	..	..	..	..	..	..	..	..	..	..	..	..	1	2	..	1	..	3	4	85 00
Possession of hen pheasants and grouse during close season	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	75 00
Possession of hen pheasant and partridge during close season	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	2	2	175 00
Hunting pheasants without a licence	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	1	1	5 00
Possession of wild duck during close season	..	..	..	..	..	..	..	..	..	..	1	..	1	..	..	..	..	2	2	35 00
Killing ducks during close season	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	..	..	2	2	100 00
Shooting swans during close season	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	50 00
Shooting game birds without a licence	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	5 00
Hunting game birds during close season	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	20 00
Hunting game birds from a power-boat	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	..	..	4	4	67 50
Setting net for the taking of game birds	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	10 00
Game birds on premises of shop or restaurant	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	1	..	2	3	30 00
Hunting game birds in prohibited area	..	..	..	..	..	..	..	..	..	..	..	2	..	1	..	3	2	3	8	40 00

Licences.																				
Carrying firearms without a licence	4	1	1	3	..	1	5	..	1	..	1	3	17	7	8	2	3	52	57	428 50
Carrying firearms without a licence under age	..	..	..	..	..	..	..	1	..	..	..	..	..	..	..	1	..	1	2	5 00
Carrying firearms without accompanying badge	..	..	..	..	..	..	..	..	..	..	..	..	..	3	3	..	..	6	6	22 50
Non-resident carrying firearms without a licence	..	..	1	..	..	..	..	1	..	..	..	..	..	..	..	..	..	2	2	115 00
Non-resident employing a guide illegally	..	..	..	..	..	..	..	..	..	4	..	..	..	..	..	..	..	4	4	400 00
Guiding non-resident hunters without a licence	..	..	..	..	..	..	..	..	..	2	..	..	..	..	..	..	..	2	2	20 00
Using another person's licence	1	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	5 00
Using farmer's licence on lands other than his own	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	5 00
Hunting game birds with a prospector's licence	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	1	1	5 00
Killing game without a licence	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	3	3	15 00
Firearms.																				
Carrying a pump-gun not properly plugged	..	..	..	..	4	..	..	..	..	..	..	1	6	2	..	..	1	13	14	106 00
Possession of an automatic shotgun	..	..	..	..	..	..	..	1	..	..	..	..	1	..	..	..	..	2	2	10 00
Carrying firearms in an auto illegally	..	..	..	1	..	..	..	..	..	..	..	1	..	..	3	..	..	5	5	80 00
Trapping.																				
Trapping without a licence	..	..	..	9	..	..	1	..	..	..	..	1	..	..	..	3	..	11	14	450 00
Possession of traps without a licence	..	..	..	3	..	..	..	..	..	..	..	..	..	..	..	..	..	3	3	30 00
Removing a licensed trapper's traps	..	..	..	2	..	..	..	..	..	..	..	..	..	..	..	..	..	2	2	50 00
Possession of pelts of fur-bearing animals illegally	..	..	..	2	..	..	..	..	..	..	..	..	1	..	..	..	..	3	3	50 00
Miscellaneous.																				
Hunting between sunset and sunrise	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3	..	..	3	3	150 00
Hunting game during close season	..	..	..	..	..	..	..	..	..	2	..	..	..	3	..	..	..	5	5	355 00
Shooting game during close season	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	.....
Trespassing in pursuit of game	..	..	..	..	..	..	1	..	..	..	..	..	..	2	..	1	..	3	4	50 00
Giving false information to an officer	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	1	1	10 00
Refusing to stop to be searched	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	.....
Game on premises of a restaurant	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	1	1	5 00
Non-resident killing deer without licence	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	3*	..	..	3	.....
Defendant not found.																				
Non-resident carrying firearms without a licence	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..	..	..	1	1	.....
																				$6,024 50
Gaol Sentences.																				
Pit-lamping	..	..	..	..	..	..	..	..	..	..	..	..	..	..	4	..	..	4	4	60 days.
Trapping without a licence, season 1918-19	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	1	1	4 mos. h.l.
Trapping during close season and carrying firearms without licence	..	..	..	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	2	120 days.
Non-resident trapping	..	..	..	..	..	..	..	..	..	..	3*	..	..	..	..	..	..	3	3	.....
Non-resident killing fur-bearing animals	..	..	..	..	..	..	..	..	..	..	3*	..	..	..	..	..	..	3	3	.....
Non-resident killing mountain-goat during close season	..	..	..	..	..	..	..	..	..	..	4*	..	..	..	..	..	..	4	4	.....
Non-resident killing calf moose during close season	..	..	..	..	..	..	..	..	..	..	3*	..	..	..	..	..	..	3	3	.....
Non-resident carrying firearms without licence	..	..	..	..	..	..	..	..	..	..	3*	..	..	..	..	..	..	3	3	.....
Trapping without a licence	..	..	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	1	1	2 months.
	8	1	3	23	5	1	6	12	6	8	25	18	61	27	31	25	7	235	267	.....

* NOTE.—These charges were laid against three non-residents.

LIST OF FIREARMS CONFISCATED FOR INFRACTIONS OF THE "GAME ACT," JANUARY 1ST, 1919, TO DECEMBER 31ST, 1919.

Confiscated from.	Magistrate.	Date of Confiscation.	Place of Confiscation.	Kind confiscated.
		1919.		
Sim, Aleck	C. H. Beevor-Potts	Jan. 22	Nanaimo	1 rifle.
Brown, Fred	"	" 22	"	1 rifle.
Ardas, Victor	"	April 28	"	1 rifle.
Bell, H. P.	J. A. P. Crompton	June 28	Creston	2 rifles.
Campbell, G.	C. H. Beevor-Potts	July 24	Nanaimo	1 rifle.
Allen, W.	R. Hewat	Aug. 11	Waldo	1 rifle.
Harada, E.	John McKee	Sept. 25	Ladner	1 shotgun.
Matthews, Ed.	N. Binns	July 25	Trail	1 rifle.
Martin, D.	"	" 25	"	1 rifle.
Nesbitt, G.	H. Wright	Aug. 22	"	1 rifle.
Kamachi, T.	J. McKee	Oct. 1	Ladner	1 rifle.
Hiayam, T.	"	" 1	"	1 pump-gun.
Yamamoto, S.	"	" 1	"	1 pump-gun.
Hopcott, J. S.	"	" 22	"	1 pump-gun.
Quong, C.	"	" 27	"	1 pump-gun.
Pearson, P.	"	" 22	"	1 pump-gun.
Peyto, R.	G. Rosoman	Nov. 10	Trail	1 rifle.
Callum, W.	G. Jay	" 26	Victoria	1 shotgun.
Morrow, L.	J. A. P. Crompton	" 18	Creston	1 shotgun.
Anderson, C.	"	" 18	"	1 shotgun.
Dean, E.	J. R. Hunnex	" 8	Salmo	1 shotgun.
Mossey, Wm.	C. H. Beevor-Potts	" 27	Cumberland	1 rifle.
Conn, T.	"	" 27	"	1 rifle.
Lewis, J.	"	" 27	"	1 shotgun.
Izatt, R.	"	" 27	"	1 shotgun.
Wilms, R.	J. McKee	" 27	Ladner	1 rifle.
Fillinger, F.	"	" 27	Vancouver	1 shotgun.
Peterson, A.	"	" 27	"	1 rifle.
Johnnie, S.	G. Jay	Dec. 5	Victoria	1 pump-gun.
Gardner, A. P.	C. E. Darling	Nov. 29	Vancouver	1 pump-gun.
Eight convictions obtained by Deputy Inspector Owen, Fernie, on his expedition into the Flathead country				2 revolvers and 3 rifles.

LIST OF PELTS CONFISCATED, OR TRAPPED UNDER PERMIT, DISPOSED OF AND ON HAND.

How obtained.	Purchased by.	Description.	Amount sold for.
Confiscated	Hudson's Bay Co.	3 beaver, 2 musk-rat, 1 mink, 1 bear, 1 goat, 3 marten, 7 weasel	$103 70
Surrendered for bounty	Hudson's Bay Co.	4 coyotes	15 00
Trapped under permit (half proceeds to Government)	F. Foster & Co.	5 beaver	34 50
Total			$153 20

On Hand.—Confiscated pelts: 3 weasel, 1 mink, 6 musk-rat, 1 bear-skin (mounted) in office of Provincial Game Warden.

Hunting Accidents during the Season 1919.

Date	Name.	Locality.	Cause of Accident.	Nature of Injuries.	Inflicted by.	Result.
July 16	Jimmy (Indian)	Upper Finlay	Mistaken for a moose	Shot through abdomen	Joseph (Indian)	Died.
Sept. 9	Upper, R. A.	Revelstoke	Removing loaded guns from auto	Shot through right lung	...	Died.
" 10	Cameron, A.	Three Forks	Accidental discharge of rifle	Shot through neck	E. Stewart	Died.
" 13	Depew, J.	Victoria	Mistaken for a deer	Shot-wounds in body	E. Salub	Not serious.
" 18	Harbridge, A.	Smithers	Shotgun in contact with log	Not reported	...	Died.
" 21	Hutchison, Miss	Victoria	Magazine of rifle not properly emptied	Shot through leg (right)	Father	Recovered.
" 28	Boldens, C.	Britannia Beach	Shotgun in contact with tree	Shot through left hand	...	Loss of third finger.
" 28	Harper, J.	Kamloops	Accidental discharge of shotgun in boat	Shot in left hand and leg	...	Loss of two fingers.
Oct. 2	Hartzsee, C.	Penny	Accidental discharge of rifle	Shot in left arm and side	N. Peterson	Not serious.
" 12	Bayliss, W.	Victoria	Falling over cliff	Back broken	...	Paralysed.
" 13	Bristow, R.	Kamloops	Rifle-cartridges jamming	Shot through left hand	...	Not serious.
" 19	Waddell, L.	Alberni	Accidental discharge of shotgun in boat	Shot in left side	...	Recovered.
" 26	Smith, G.	Vancouver	Accidental discharge of shotgun in boat	Not reported	...	Died.
" 31	Otto, P.	Victoria	Shotgun in contact with fence	Shot in leg	...	Not serious.
Nov. 13	Davis, C.	Bowen Island	Mistaken for deer	Not reported	C. Quirk	Died.
" 17	Baine, W.	Melville Camp	Accidental discharge of shotgun	Shot in left elbow	...	Permanent stiff arm.
" 21	Thomas, C. W.	Ocean Falls	Falling over cliff	Fractured skull	...	Died.
" 26	Sutton, J.	Quesnel	Clubbing dogs with rifle	Shot in thigh	...	Recovered.
" 29	Hewitt, F.	Nass Harbour	Shotgun in contact with rocks through slipping	Shot in right leg	...	Died.
" 29	Chapman, F.	Masset	Shotgun bursting	Injured in left hand	...	Not serious.
Dec. 13	Harding, S.	Nanaimo	Accidental discharge of shotgun through slipping on ice	Shot in leg	...	Leg amputated.
" 18	Blakeley, H.	Golden	Mistaken for a deer	Shot through head	P. Legace	Died.
" 24	Lovquist, H.	Quesnel	Shot by grouse-hunter	Not reported	C. Johnson	Died.

APPENDIX D.

OFFICERS, GAME ASSOCIATIONS, AND GUIDES.

LIST OF PROVINCIAL POLICE OFFICERS.

Headquarters, Victoria.

Superintendent's Office—		
Superintendent	Wm. G. McMynn	Victoria.
Inspector	F. R. Murray	„
Clerk and Constable	D. G. Cox	„
Chief Detective	G. A. Hood	„
Clerk	H. H. Clarke	„
Clerk	C. Clark	„
Clerk and Constable	T. Conly	„
Provincial Game Warden's Office—		
Acting Chief Game Inspector	R. E. Hose	Victoria.
Clerk and Constable	F. R. Butler	„
Provincial Motor Licence Office—		
Clerk and Constable	C. A. Booth	Victoria.
Clerk and Constable	W. H. Handley	„
Clerk and Constable	G. H. Jennings	„
Victoria Police District—		
Constable	R. Gidley	Victoria.
„	R. Owens	„
„	A. P. Cummins	Colquitz.
„	S. W. Long	„
„	W. Kier	Duncan.
„	J. N. Rogers	Ganges.
„	H. Bishop	Sidney.

Boundary District.

Chief Constable	J. A. Fraser	Greenwood.
Constable	G. Stanfield	Grand Forks.
„	A. E. Spall	Hedley.
„	F. G. Brown	Keremeos.
„	W. B. Stewart	Midway.
Senior Constable	C. F. Evans	Princeton.
Constable	A. Arden	„

Fort George District.

Deputy Inspector	T. W. S. Parsons	South Fort George.
Chief Constable	J. Bourne	„ „
Constable	H. Avison	„ „
„	G. E. Ashton	„ „
„	M. H. Mansell	„ „
„	F. W. Gallagher	Lucerne.
„	H. J. McDougall	McBride.
„	W. R. Henley	Vanderhoof.

Fort St. John District.

Chief Constable	Harry Taylor	Fort St. John.
Constable	J. A. Freeman	„ „
„	G. J. Duncan	Pouce Coupe.

Hazelton District.

Chief Constable	J. Kelly	Smithers.
Constable	W. J. Service	„
„	S. G. Robinson	Francois Lake.
„	Sperry Cline	Hazelton.
„	A. Fairbairn	Telkwa.

Kamloops District.

Deputy Inspector	W. R. Dunwoody	Kamloops.
Acting Chief Constable	Geo. H. Adam	„
Constable and Gaoler	A. Noble	„
Constable	R. Pritchard	„
„	P. W. Jupp	Chase.
„	F. N. Emmott	Ducks.
„	Alex. Dunbar	Falkland.
„	H. H. Vickers	Mount Olie.
„	J. Eggleshaw	Savona.
„	J. J. McConnell	Sicamous.

North-east Kootenay District.

Chief Constable	R. J. Sutherland	Golden.
Constable	F. H. Butwell	„
„	B. E. Drew	„
„	R. F. Mills	Athalmer.
„	W. H. Dawson	„
„	A. E. Farey	Field.
„	J. Mead	Revelstoke.

South-east Kootenay District.

Deputy Inspector	W. L. Fernie	Fernie.
Acting Chief Constable	W. E. V. Spiller	„
Constable	S. J. McNally	„
„	C. H. Martin	Bull River.
„	A. W. Collins	Coal Creek.
„	G. W. Shipman	Corbin.
„	C. Kerr	Cranbrook.
„	M. Gorman	Elko.
„	J. Walsh	Fort Steele.
„	R. King	Kimberley.
„	H. D. Hughes	Michel.
„	H. Hughes	Natal.
„	A. Dryden	Waldo.
„	W. H. Laird	Yahk.

West Kootenay District.

Chief Constable	Ernest Gammon	Nelson.
Constable	H. W. King	„
„	E. A. Vachon	Creston.
„	J. W. Chadwick	Kaslo.
„	A. M. Pearman	Nakusp.
„	Geo. M. Gunn	New Denver.
„	Harvey McLaren	Salmo.
„	J. F. Johnston	Trail.

Lillooet District.

Chief Constable	F. E. Aiken	Clinton.
Constable	F. Hekmiller	„
„	Walter Bell	Hanceville.
„	T. Higginbottom	Lillooet.
„	Geo. Bell	150-Mile House.
„	Geo. H. Greenwood	Quesnel.

Nanaimo District.

Chief Constable	A. T. Stephenson	Nanaimo.
Constable	A. D. I. Mustart	„
„	F. J. Fryer	„
„	H. N. Wood	Alberni.
„	J. A. Williams	Clayoquot.
„	H. B. Dawley	Courtenay.
„	G. C. Mortimer	Cumberland.
„	J. Russell	Ladysmith.
„	F. Varney	Quatsino.

Prince Rupert District.

Chief Constable	A. C. Minty	Prince Rupert.
Constable	Alexander Saint	„
„	J. P. Scarlett	Alice Arm.
„	Robert Webster	Atlin.
„	Frank Broughton	Bella Coola.
„	P. Carr	Granby Bay.
„	Russell P. Ponder	Masset.
„	R. A. Beavan	Ocean Falls.
„	Robert Gibson	Port Essington.
„	A. W. Stone	Rivers Inlet.
„	P. S. Jack	Stewart.
„	H. W. Dodd	Telegraph Creek.

Vancouver District.

Deputy Inspector	W. Owen	Vancouver.
Chief Constable	F. Cruickshank	„
Senior Constable	S. North	„
Clerk and Constable	J. S. Craig	„
Clerk, Constable, and Cashier	J. G. Cook	„
Clerk and Constable	E. McArthur	„
Constable	H. C. Pyke	„
„	W. A. Wisley	„
„	S. S. Saunders	„
„	J. A. Thomas	„
„	J. G. Cunningham	„
„	J. A. Hird	(Launch "Watla.")
„	R. L. Matthews	Alert Bay.
„	T. G. Mason	Britannia Beach.
„	H. A. Laughlan	Chilliwack.
„	W. V. Fenton	Ladner.
„	James Callander	Mission City.
„	J. Macdonald	New Westminster.
„	W. J. Voisey	„
„	W. H. Hadley	Powell River.
„	S. Marshall	Quathiaski Cove.
„	W. H. Cameron	Rosedale.
„	F. French	Sechelt.
„	T. M. Forknall	Squamish.
„	J. Renner	Abbotsford.

Vernon District.

Chief Constable	Geo. A. Carter	Vernon.
Constable	J. M. Smith	„
„	G. A. Johnson	Enderby.
„	J. Rankin	Kelowna.
„	E. C. Graham	„
„	C. F. Oland	Lumby.
„	Alex. King	Penticton.

Yale District.

Acting Chief Constable	R. W. Bowen	Ashcroft.
Constable	W. Greenwood	Hope.
„	T. Smith	Lytton.
„	P. C. Badman	Merritt.
„	G. Lodwick	Nicola.
„	A. Strang	North Bend.

December 31st, 1919.

List of Game and Fish Associations.

Northern British Columbia.

Rupert Rod & Gun Association	Prince Rupert.
Omineca District Rod & Gun Club	Smithers.
Fort George District Game Protective Association	Prince George.

Central British Columbia.

Harpers Camp Trappers' Association	Harpers Camp.
Kamloops Game & Fish Protective Association	Kamloops.
Salmon Arm Sportsmen's Association	Salmon Arm.
North Okanagan Game & Fish Association	Vernon.
South Okanagan Game & Angling Association	Kelowna.
Penticton Fish, Game & Forest Protective Association	Penticton.

Kootenay District.

Windermere District Rod & Gun Club	Invermere.
Fernie District Rod & Gun Club	Fernie.
Cranbrook District Rod & Gun Club	Cranbrook.
Nelson District Rod & Gun Club	Nelson.
Creston Game & Fish Association	Creston.

Lower Mainland.

Vancouver Angling & Game Association	Vancouver.
Chilliwack Game Protective Association	Chilliwack.
North Shore Fish, Game & Forest Protective Society	North Vancouver.

Vancouver Island.

Victoria & Island Fish & Game Association	Victoria.
Saltspring Island Rod & Gun Club	Ganges.
Denman Island Fish & Game Protective Association	Denman Island.
Comox Fish & Game Protective Association	Courtenay.

List of Guides, Season 1919-20.

Atlin District.

Jack, Taku	Atlin.

Peace River District.

Taylor, Martin B.	Pouce Coupe.

Cassiar District.

Conover, A. B.	Clearwater.
Williams, Geo.	Telegraph Creek.
McClusky, Mike	„
Abesta, Bob	„
Bear Lake Billy	„
Colbert, John	„
Frank, Bennie	„
Hyland, Dennis	„
Inash, Charlie	„
McKlusky, Pat	„
Dick, Little	„
Johnnie, Packer	„
Reid, Bob	„
Dougan	„
Decker, Lou	„
Dick, Lame	„
Martin, Larrie	„
Hengu, Pete	„
Fann, Billy	„
Dunstan, Tom	„

Fort George District.

McPauline, J.	Rush Valley.
McPauline, F.	„
Nelson, C.	Dunster.
Bittian, H.	Grant Brook.
Dennison, Geo. M.	„
Hargreaves, Geo. E.	Tete Jaune Cache.
Renshaw, J. R.	McBride.
McMillan, Robt.	Shere.
Hartsell, C.	Penny.
Noeboe, J. R.	„
Hartman, M. G.	„
Sykes, B. S.	„
Hutchison, J.	McBride.

Barkerville District.

Kibbee, Frank D.	Barkerville.
Wendle, Jos.	„
Mason, Harold	„
Reed, F. de W.	„
Cochran, J. D.	„
Foulk, W. A.	„

Lillooet District.

Manson, W. M.	Lillooet.
Manson, W. G. C.	„
Gott, Francis	„

Kootenay District.

Sheek, Wesley	Field.
McCorkell, Bert	„
Townsend, C. S.	„
Lawrence, C. G.	Golden.
Lagace, Pete	Durien.
Lagace, Ray	„

Kootenay District—Continued.

Stewart, C.	Galena.
Nixon, W. J.	Brisco.
Hope, J. A.	„
Schofield, Bert	„
Lum, Geo.	Fort Steele.
White, James	„
Stevens, Earl	Howser.
Woods, Oswald	Natal.
De Clara, John	„
Harmer, F.	Elk Valley.
Cork, T.	„
Lewis, C. J.	Fernie.
Nicol, Arthur	„
McQuarrie, Neil	„
Dawson, E. J.	Athalmer.
Kain, Conrad	Wilmer.
Mawdsley, H.	Crawford Bay.

APPENDIX E.

GAME PROPAGATION.

Report from Provincial Constable A. P. Cummins on the Operations at the Colquitz Pheasant-farm, April 1st to December 31st, 1919.

Pheasant-rearing Season.

The pheasants started to lay April 19th and some 3,000 eggs were laid during the months of May and June. The great difficulty in getting suitable broody hens was the cause of a number of eggs being spoilt. There were 1,600 young birds hatched.

Vermin destroyed a number of young chicks; for instance, when the first one hundred young birds were doing well, a cat killed fifteen out of a brood of sixteen in an hour and a half, and was trapped in the long grass when coming back for the last bird. Then, again, hawks, both sparrow and sharp-shinned, were constantly taking birds, and sixteen hawks were shot in the rearing-fields when in the act of or attempting to take birds. Cats were taking birds off and one was shot after killing a half-grown bird.

A dry spell from May 24th to the middle of August, with exceptionally cold nights, made insect food, the mainstay of young pheasants, hard to obtain.

List of Birds turned out, Season 1919-20.

Previous to breeding season: 40 birds turned out at Wilkinson Road Gaol and at Elk Lake Reserve; 18 cock birds turned out on Gulf Islands; 3 Chinese cock birds sent to Mainland; 10 Chinese hen birds turned out locally.

After the breeding season: 16 old Mongolian hen birds and 4 old Mongolian cock birds sent to Cranbrook.

Breeding stock in pens: 130 Mongolian hen birds and 30 Mongolian cock birds.

Young Pheasants distributed, 1919.

July	7.	50	birds	at Rithet's Farm, Saanich.	Aug.	5.	25	birds	at Cobble Hill.
„	9.	60	„	on Gulf Islands.	„	5.	25	„	at Somenos.
„	10.	140	„	on Mainland.	„	5.	25	„	at Westholme.
„	16.	100	„	on Mainland.	„	5.	50	„	vicinity of Victoria.
„	22.	200	„	on Mainland.	„	8.	25	„	at Duncan (Mr. Pemberton).
„	29.	100	„	on Mainland.					
„	29.	25	„	at Comox (Mr. Higgins).	„	25.	100	„	on Mainland.
Aug.	5.	50	„	at Saanichton.			250	stray birds	from field (local).

Young Birds kept for Stock.

100 young birds kept for stock at Colquitz Farm.

Number of Birds in Pens at Present Time.

70 second-year Mongolian hens.
20 second-year Mongolian cocks.
70 young Mongolian hens.
30 young Mongolian cocks.
25 Chinese hens.
13 Chinese cocks.

Vermin killed in Neighbourhood of the Colquitz Farm.

140 rats (trapped).
250 blue jays (trapped).
36 hawks (trapped and shot).
3 crows (shot).
39 cats (trapped).

Vermin trapped at Elk Lake Reserve.

9 cats.
150 blue jays.
1 weasel.
14 rats.
6 hawks.
11 racoon.

FOX-FARMERS' RETURNS TO AUGUST 31ST, 1919.

Name.	Address.	Old Foxes.			Pups bred in Captivity.			Total.	Additional Foxes lost or disposed of.		
		Silver.	Cross.	Red.	Silver.	Cross.	Red.		Died.	Killed.	Sold.
H. Laverdiere	Atlin	1	5	..	3	3	..	12	..	1	..
White & Murphy	Atlin	8*	..	..	2	2	6	18	..	..	..
Homfray & Axten	Walhachin	5	3	..	4	1	..	13	..	3	..
W. B. Conroy	Atlin	24	4	..	14	2	..	44	..	10	..
Landry & Demorest	Bella Coola	2	2	..	..	..	..	4	2	..	..
D. Laiti	Sointula	1	1	..	3	..	..	5	..	4	..
B. D. Tanton	Bella Coola	5	5	..	..	..	..	10	..	..	..
J. L. Barker	Bickle	4	6	..	4	5	..	19	..	..	..
T. W. White	Atlin	2	4	..	..	5	..	11	..	..	..
Stikine Fox Farm	Telegraph Creek	14	8	1	..	2	..	25	..	4	..

* Not described.

APPENDIX F.

REGULATIONS AND GAME KILLED.

SCHEDULE OF OPEN SEASONS.

Moose	Sept. 1-Dec. 15.	In Atlin, Fort George, Omineca, and Cariboo Electoral Districts.
Caribou	Sept. 1-Dec. 15.	Throughout the Province, *except* south and east of the main line of C.N.R. and in Queen Charlotte Islands.
Wapiti	Oct. 1-Oct. 15.	In Columbia, Fernie, and Cranbrook Electoral Districts.
Mountain-sheep	Sept. 1-Nov. 15.	North of the main line of the G.T.P.
	Oct. 1-Oct. 15.	In Columbia, Fernie, and Cranbrook Electoral Districts.
Mountain-goat	Sept. 1-Dec. 15.	Throughout the Province.
Bear	Sept. 1-June 30.	Throughout the Province.
Deer	Sept. 13-Dec. 15.	Throughout the Province, *except* in Queen Charlotte Islds.

	Northern.	Eastern.	Western.
Duck, snipe, and plover	Sept. 6-Dec. 20	Sept. 6-Dec. 20	Sept. 13-Dec. 27 north of 51st parallel; Oct. 18-Jan 31 south of 51st parallel.
Geese and brant	Sept. 6-Dec. 20	Sept. 6-Dec. 20	Sept. 13-Dec. 27 north of 51st parallel; Nov. 15-Feb. 28 south of 51st parallel.
Blue grouse*	Sept. 6-Nov. 6 north of 56th parallel; Sept. 6-Sept. 21 south of 56th parallel	Sept. 6-Sept. 21	Sept. 13-Oct. 17.

	Northern.	Eastern.	Western.
Willow grouse* and Franklin	Sept. 6-Nov. 6 north of 56th parallel; Sept. 6-Sept. 21 south of 56th parallel	Sept. 6-Sept. 21	Sept. 13-Sept. 28.
Ptarmigan.	Sept. 6-Dec. 31		
Prairie-chicken	.....	Sept. 21-Sept. 28, in Kamloops Electoral District	
Pheasants†	.....	Oct. 27-Nov. 1 in South Okanagan Electoral District; Oct. 27-Nov. 8 in Similkameen Electoral District	Oct. 18-Nov. 16.
Quail	.....	Oct. 27-Nov. 8 in Similkameen and South Okanagan Electoral Districts	Oct. 18-Nov. 23 in Cowichan, Esquimalt, Saanich and Islands Electoral Districts.
European partridges ...	.....	.....	Nov. 21-Nov. 23 in Delta and Saanich Electoral Districts.
Foxes	Nov. 1-Mar. 15	Throughout the Province.	
All other fur-bearing animals, *except* beaver	Nov. 1-Apr. 30	Throughout the Province.	

* Except in Delta Electoral District.
† Except in Alberni and Comox Electoral Districts.

STATEMENT OF BOUNTIES PAID DURING 1919.

Government Agency.	Wolves.	Cougars.	Coyotes.	Crows.	B.H. Owls.
Mainland.					
Atlin	5	..	..	..	..
Ashcroft	..	2	32	..	..
Clinton	1	7	51	..	..
Cranbrook	..	9	48	..	..
Fairview	..	2	14	..	..
Fernie	..	..	15	..	..
Fort George	..	1	2	..	..
Fort Fraser	..	..	4	..	..
Fort St. John	3	..	..	..	..
Golden	..	7	11	..	..
Grand Forks	..	..	..	..	..
Greenwood	..	6	7	..	..
150-Mile House	..	7	16	..	..
Smithers	2	..	..	..	..
Kamloops	..	13	34	..	..
Kaslo	..	3	..	..	..
Lillooet	..	..	1	..	..
Nelson	..	7	1	..	..
New Westminster	..	1	5	..	11
Nicola	..	..	12	..	..
Prince Rupert	47	..	..	163	..
Princeton	..	..	3	..	..
Quesnel	..	..	24	..	..
Revelstoke	5	4	5	..	..
Rossland	..	1	..	..	..
Telegraph Creek	..	..	..	..	..
Vernon	..	13	15	53	..
Vancouver	5	4	..	144	16
Vancouver Island.					
Alberni	..	13	..	..	..
Cumberland	3	11	..	268	3
Duncan	..	22	..	..	2
Nanaimo	..	5	..	140	..
Victoria	53	22	1	173	19
Totals	124	160	301	941	51

Recapitulation.

Wolves	120 mature,	4 young.
Cougar	151 mature,	9 young.
Coyotes	215 mature,	96 young.
Crows	941	
Owls	51	

STATEMENT OF BIG GAME KILLED BY HOLDERS OF NON-RESIDENT GAME LICENCES, SEASON 1919-20.

Licences issued.	District.	Moose.	Elk.	Caribou.	Deer.	Goat.	Sheep.	Grizzly Bear.	Black Bear.
1	Atlin	1	..	2	..	2	1	..	..
23	Cassiar	16	..	31	..	28	43	23	7
12	Fort George	3	..	2	..	2	..	..	1
3	Lillooet	..	..	..	3	1	..	1	1
81	Kootenay*	..	2	1	10	43	1	4	2
5	Barkerville	3	..	3	..	2	..	..	..
2	Bella Coola	..	..	3	1	1	..	1	..
2	Clinton†	..	..	..	..	..	..	..	..
12	New Westminster†	..	..	..	..	..	..	..	..
18	Vancouver†	..	..	..	..	..	..	..	..
2	Victoria	..	..	..	2	..	..	..	..

* Returns incomplete. † Hunting game birds only.

RETURNS FROM 1,364 HOLDERS OF TRAPPERS' LICENCES, SHOWING THE BIG GAME AND NOXIOUS ANIMALS KILLED.

Big Game.

Moose	200
Mountain-sheep	7
Mountain-goat	157
Caribou	92
Bear	935
Deer	750

Noxious Animals.

Wolves	49
Cougars	24
Coyotes	370

FUR-BEARING ANIMALS TRAPPED DURING SEASON 1918-19—RETURNS FROM 1,364 HOLDERS OF TRAPPERS' LICENCES.

Beaver	8,854
Marten	6,846
Otter	258
Mink	3,954
Racoon	986
Fox	158
Musk-rat	33,877
Lynx	1,880
Wild-cat	69
Weasel	22,204
Wolverine	256
Fisher	502

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1920.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

PROVINCIAL MUSEUM

OF

NATURAL HISTORY

FOR THE YEAR 1919

PRINTED BY
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1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits the Annual Report of the Provincial Museum of Natural History for the year 1919.

J. D. MACLEAN,

Provincial Secretary.

Provincial Secretary's Office,

Victoria, February, 1920.

PROVINCIAL MUSEUM OF NATURAL HISTORY,
VICTORIA, B.C., February 24th, 1920.

The Honourable J. D. MacLean, M.D.,
Provincial Secretary, Victoria, B.C.

SIR,—I have the honour, as Director of the Provincial Museum of Natural History, to lay before you the Report for the year ending December 31st, 1919, covering the activities of the Museum.

I have the honour to be,
Sir,
Your obedient servant,

FRANCIS KERMODE,
Director.

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PROVINCIAL MUSEUM REPORT

FOR THE YEAR 1919.

In making the Annual Report for the year it is deemed advisable to give as much as possible of the inception, history, and progress of the Institution.

A museum is an institution for the preservation of those objects which best illustrate Nature and the works of man; the use of these for the increase of knowledge and for the culture and enlightenment of the people; its special functions being to preserve and utilize objects of nature and works of art and industry. It supplies a need which is felt in every intelligent community, which cannot be supplied by any other agency; it does not exist, except among highly enlightened people, and attains its highest development only in great centres of civilization.

The growth of a museum from day to day may seem very small, but, if taken year by year, it shows what is accomplished with hard work and deep study.

It was on December 2nd, 1886, that the Provincial Museum was formally opened in a small room, 20 x 12 feet, in the old Government Building in the City of Victoria. The first Curator was the late John Fannin, who was informed that he would have to make the best of the accommodation until better quarters could be secured; in these quarters the first three years of the life of the Museum was spent.

On the removal of the Supreme Court to a new building, the Provincial Museum was moved into the old Supreme Court Building, and was formally opened to the public on May 24th, 1889, and the work of building up the institution was commenced in earnest. Gradually, but surely, the development of the Museum advanced until again the accommodation was totally inadequate. Then, again, when the present Legislative Buildings were erected, the east wing was allotted to the Provincial Museum, into which building the natural-history specimens were transferred in April, 1898, but the mineral exhibit, which had been part of the Provincial Museum up to this time, was transferred to the old Legislative Building for exhibition, and became part of the Department of Mines. The natural-history collections have now greatly outgrown the present building, which is used for exhibition purposes. All the valuable study series and a mass of material are stored in a wooden frame building at the rear, and cannot be exhibited on account of lack of exhibition space.

The collection is worthy of a large building, and is a credit not only to the Government, under whose direction it is managed, but to the people of the Province, whose individual efforts in the way of contributions have done so much to assist its growth.

The only financial support the institution receives is the annual vote granted by the Legislative Assembly, which is used as economically as possible, so as to get the best results.

It was not until February 21st, 1913, that an Act of Legislature was passed, endorsing the establishment of a Provincial Museum, making it statutory, defining its objects, and making regulations governing the working of the institution. The Department is under the control of the Honourable J. D. MacLean, M.D., C.M., Provincial Secretary and Minister of Education.

OBJECTS.

(*a.*) To secure and preserve specimens illustrating the natural history of the Province.

(*b.*) To collect anthropological material relating to the aboriginal races of the Province.

(*c.*) To obtain information respecting the natural sciences, relating particularly to the natural history of the Province, and diffuse knowledge regarding the same.

ADMISSION.

The Provincial Museum is open, free, to the public daily throughout the year from 9 a.m. to 5 p.m. (except New Year's Day, Good Friday, and Christmas Day); it is also open on Sunday afternoons from 1 p.m. to 5 p.m. from May 1st until the end of October.

VISITORS.

The number of visitors to the Provincial Museum during the year 1919 has been a slight increase over that of 1918, over 40,000 having signed the visitors' register.

These figures are by no means accurate, as a great many people do not seem to like the idea of recording their names, and no record has been kept of the number of classes from the public schools of the city who, accompanied by their teachers, visited the Museum in connection with their nature-study. There have also been a number of specialists in several branches of natural sciences from some of the large museums of the continent who wished to examine the study series, which are stored in the annex, for which permission was gladly given by the Director.

It will be noticed, by referring to the first register that was kept by the Museum, in 1888, that only 500 people left their signatures. The number of visitors increased year by year until the year 1914, when, on the outbreak of the European war, the tourist travel to the West at that time received a considerable set-back. For about two years this seemed to affect the travel, but from then on, I am pleased to say, the visitors again began to increase not only throughout the summer seasons, but also a great many came from Alberta and Saskatchewan during our winter seasons on account of our milder climate.

ACTIVITIES.

As will be seen by the report in the several branches of natural history, no actual field parties were sent afield during the last summer, but this does not mean that the activities of the Museum were dormant, as considerable work has always to be done in connection with the Museum, in classification and identification of specimens from time to time, to make them more accessible to inspection and for study.

This work is carried on by a very small staff, all scientific work involving upon the Director and the Assistant Biologist, who are assisted by a few personal friends. The invaluable assistance afforded the institution by members of the large institutions of America, more particularly the staff of the Smithsonian Institution and the Biological Survey of the United States National Museum of Washington, D.C. (to whom a large number of specimens are sent for their specialists to identify and verify), cannot be too highly appreciated.

The specific identification of many of our small mammals is a difficult problem, owing to the lack of any large series from many localities, and not having the necessary appliances for the examination of cranial and dental characters, upon which determinations are greatly based.

In many instances it is also necessary to make comparison with type specimens, most of which are to be found in the largest institutions of America and Europe, and for this reason we have to rely greatly on the generosity and kindness of several well-known scientists.

ANTHROPOLOGY.

Very little material has been added to the anthropological collection this year, with the exception of several small specimens.

Mr. G. E. Darby, Medical Superintendent of the Bella Bella Hospital, donated to the Museum a piece of rope made of cedar-bark, which he states was found by an Indian, Moses Knight, who found a considerable quantity of it concealed in a cave on a small island near Bella Bella.

Miss Dorothy Matthews presented an Indian skull which she had found at Patricia Bay, North Saanich, in July, 1917. This skull is typical of the Indians of the Saanich Tribe of the Coast-Salaish Indians.

Mr. J. P. Babcock, the Deputy Commissioner of Fisheries, presented an Indian blanket made from the feet of the grey timber-wolves. This blanket was made by the Babine Indians at Babine Lake, B.C., which tribe of Indians belongs to Athapascan or Déné stock.

MAMMALS.

The Museum has received, through the efforts of Mr. H. W. Dodd, Government Agent at Telegraph Creek, a magnificent pair of locked caribou antlers in a perfect state of preservation. These antlers were found on Cariboo Mountain, West Cassiar, by Mr. W. Beach, of New York City, a big-game hunter, who was hunting at the headwaters of the Stikine in 1918. The battle which caused the death of these animals took place, no doubt, in the month of September, 1917, as traces of the velvet still remain on the antlers. The dimensions of the antlers are:—No. 1: Length of beam, 52 inches; spread, 44½ inches; points, 29 inches. No. 2: Length of beam,

51½ inches; spread, 32 inches; points, 29 inches. These two heads make a magnificent exhibit on the walls of the Museum.

Mr. E. W. Nelson, Chief of the Bureau of Biological Survey, United States Department of Agriculture, Washington, D.C., wrote asking for the loan of our study series of Ochotona, commonly called Little Chief Hare, as Mr. A. H. Howell, a specialist in their Department, was working on a revision of this genus, and wished to have specimens from every available portion of the country, so as to assist him in his classification and distribution of this interesting little mammal. Eighteen skins and skulls were loaned by this Department, which in due course were returned.

Bounties on Wolves.

According to the Orders in Council passed under the "Game Protection Act," all applications for bounties on wolves must be sent to the Director of the Provincial Museum for verification.

It is interesting to note that the Government, for the year 1919, was only called upon to pay the bounty on 100 timber-wolves, the bounty on which was $10 per head, but was increased by Order in Council to $15 on September 1st, 1919. It will be noticed that most of these applications have come from the Northern Coast and Northern Interior of the Province, very few applications for bounties being made south of the main line of the Canadian Pacific Railway, and I have no record of any applications being made on a wolf that was killed on Vancouver Island during the year. Wolves must be getting very rare on Vancouver Island, as the price now offered in the fur market ranges from $25 to $40, plus the Government bounty of $15 per head. This makes the pelts quite valuable, and therefore these animals would not be passed up by any hunter or trapper.

Several coyotes have been turned in with the timber-wolves by persons making applications for bounty; these, however, have been identified as coyotes, and bounty refused, unless the pelts were turned in to the Government to receive the Government bounty, which is only $2 on this animal.

Distribution in British Columbia of some Families of the Order Rodentia.

Small Mammals.—Animal life is very generously represented in British Columbia, probably due to the varied climate, resulting from the variance of altitude within its borders and a wide range of physiographic conditions. The life-zones range through the Transition, Canadian, and Hudsonian to the Arctic-Alpine zones on the summits of the highest mountain ranges; the Upper Sonoran zone covering a small strip of country in the Southern Okanagan.

Under such conditions it is hardly to be wondered that many of the species overlap in their range of distribution and subspecies become numerous. When the biological research of this Province has been completed, where well-defined races are known to exist in these areas, no doubt many new phases of intergrading will be revealed in the intervening territory.

The series of small mammal-skins in the collection of the Provincial Museum numbers some 1,200 skins; a greater portion of these, however, belong to the order Rodentia, or rodents, and it is proposed here to give a short account of the distribution throughout the Province of some families belonging to this order.

Muridæ.

Genus *Peromyscus.*

This genus includes the so-called wood-mice, deer-mice, vesper-mice, or white-footed mice, and is by far the most numerous in species and subspecies of all our small rodents, and in some form or another inhabit almost every portion of North America.

From a large series of skins there might be an unlimited discussion of the variation in *Peromyscus*, and one would deduct from the study of groups of a long series from various localities that intergradation existed more widely than generally supposed; individual variation being greatest in specimens from localities between the ranges of two well-established forms. It would therefore appear certain, with such a wide and frequent distribution, perfect intergradation must take place between related forms of different faunal areas. Classification in such cases would depend largely upon a set standard, and on which side of the fence intergrading specimens belong must remain a matter of individual opinion.

In April, 1909, the Bureau of Biological Survey, United States Department of Agriculture, published a revision of the American genus *Peromyscus* by Mr. Wilfred H. Osgood. This work has made it possible, to a reasonable degree of certainty, to classify, at least geographically, the several species occurring throughout our range, represented by the following:—

Peromyscus maniculatus arcticus (Osgood). Geographically distributed through the interior of North-west Canada, from South-eastern Saskatchewan north along the Mackenzie River, west to the upper waters of the Yukon River, then south to Eastern Alberta, in the Canadian and Hudsonian zones.

The British Columbia specimens identified as this species were taken in the Cariboo and Telegraph Creek Districts.

Peromyscus maniculatus oreas (Bangs). Type locality, Mount Baker Range, B.C., A. C. Brooks, distributed through the Puget Sound region in the mountains and coast of Western Washington, north to Southern British Columbia, south to the Columbia River.

Peromyscus maniculatus keeni (Rhoads). A small white-footed mouse occurring on the Queen Charlotte Islands, the type of which is from Masset, Graham Island.

Peromyscus maniculatus macrorhinus (Rhoads). On the Coast of the Mainland of Northern British Columbia and Southern Alaska; type collected by the Rev. J. H. Keen at the North Pacific Salmon Cannery, mouth of the Skeena River.

Peromyscus maniculatus artemisiæ (Rhoads). Ranges through South-Central British Columbia, south through parts of Washington, Idaho, and Western Montana, in the Transition and Canadian zones; type from Ashcroft, B.C.

Peromyscus maniculatus saturatus (Bangs). Type locality, Saturna Island, Gulf of Georgia, B.C., to which it is entirely confined.

Peromyscus maniculatus austerus (Baird). Geographic distribution over the Coast region of Puget Sound, Washington, north to Southern British Columbia and including Vancouver Island.

Peromyscus sitkensis prevostensis (Osgood). So far only recorded from Prevost Island, Queen Charlotte Islands, and Forrester Island, Alaska.

Genus *Microtus*.

Voles, or meadow-mice, occur throughout the greater part of the Northern Hemisphere north of the Tropics, and both species and individuals reach their maximum abundance in the Canadian and Transition zones, a few species occurring to the north in the Hudsonian and Arctic zones, even in the barren grounds north to the Arctic Coast.

They adapt themselves to the most diversified conditions of environment, inhabiting all classes of ground, from dry arid regions to wet swamps, a few species being aquatic in their habits.

The following species are represented in the Province of British Columbia:—

Microtus drummondi (Aud. & Bach.) (Drummond's Vole). Geographically distributed from the Hudson Bay to the west slope of the Rocky Mountains, the type locality being in the vicinity of Jasper House, Alberta.

Microtus townsendi (Bachman) (Townsend Vole). Distributed through the low country west of the Cascades, from Port Moody, B.C., south to the Willamette Valley and to Yaquina Bay, Oregon, in the Transition zone.

Microtus tetramerus (Rhoads) (Vancouver Vole). The distribution of this vole, so far as known, is the southern end of Vancouver Island; type from Beacon Hill Park, Victoria, and described from the type, and seventeen specimens collected near type locality.

Microtus mordax (Merriam). Ranges from latitude 60, Rocky Mountains and outlying ranges, to Northern New Mexico; common in Canadian and Hudsonian zones; specimens recorded from Nelson, Sicamous, Hope, Shuswap, Glacier, Okanagan, and Bennett City.

Microtus serpens (Merriam). Distributed through the low country of Southern British Columbia and Northern Washington between the Cascade Mountains and Puget Sound.

Microtus nanus canescens (Bailey) (Gray Vole). East of the Cascades in Northern Washington and Southern British Columbia; specimens recorded from Okanagan, Vernon, and Ducks, B.C.

Genus *Neotoma*.

The wood-rats of this genus are confined to North America. The bushy-tailed wood-rats occurring in this Province were separated from the round-tailed species, as the genus *Teonoma*, by Gray in 1843; although this name has been regarded by most later authors as only of subgeneric rank.

The bushy-tailed wood-rats are confined chiefly to the boreal zones in the Sierra Nevada and Rocky Mountain regions, extending nearly to north latitude 60. They are chiefly found in the mountains, where they dwell and seek protection among the cliffs and caves, being expert climbers. Occasionally we hear of wood-rats in the vicinity of camps and farm-houses, where they appear to develop a fascination of kleptomania, and ludicrous are the stories told of missing knives, forks, spoons, clothing, and other articles too numerous to mention, carried away and added to the nest material. Four new species occur within our limits, none being known on Vancouver Island.

Neotoma cinerea (Ord) (Grey Bushy-tailed Rat). Distributed throughout the Rocky Mountain region in Southern British Columbia, Montana, Idaho, and several adjoining States.

Neotoma cinerea drummondi (Richardson) (Bushy-tailed Wood-rat). Throughout the Canadian zone in the Rocky Mountains of Eastern British Columbia and Western Alberta, north of the range of *N. cinerea*.

Neotoma cinerea saxamans (Osgood) (Osgood Bushy-tailed Wood-rat). Geographic distribution in Northern British Columbia, west of the Rocky Mountains, in the Canadian and Hudsonian zones; limits of range unknown.

Neotoma cinerea occidentalis (Cooper, M.C.) Baird (Western Bushy-tailed Wood-rat). From the Pacific Coast region of South-western British Columbia south to Northern California.

Leporidæ.

Genus *Lepus*.

With the exception of Vancouver Island and most of the smaller islands on the Pacific Coast, hares and rabbits are more or less distributed throughout a greater portion of British Columbia.

Until some ten years ago, when Mr. E. W. Nelson, of the Biological Survey, United States Department of Agriculture, made a revision of the rabbits of North America, very little was known of the number of species and their geographic races.

From an economic view, hares and rabbits of this genus, when numerous in agricultural areas, do considerable damage to gardens, crops, fruit-trees, and young plantations. A peculiarity also is that when they become very numerous an epidemic in the form of disease decimates them, until hardly any can be found, and this state continues for a few years, when for the next few years they again multiply very fast, and once more attain their zenith of abundance. This takes place about every seven years, and up to the present period the exact cause is little understood.

The following species are represented in the Province:—

Lepus campestris townsendi (Bachman) (Western White-tailed Jack-rabbit). It occurs in a narrow tract of land along the Okanagan Valley, terminating at Fairview, also in the Similkameen Valley for twenty miles north of the boundary.

Lepus americanus macfarlani (Merriam) (Mackenzie Varying Hare). Distributed through all the Yukon Territory, Western Mackenzie, and Northern British Columbia; its extreme northern limit coincides with that of the trees.

Lepus americanus columbiensis (Rhoads) (B.C. Snow-shoe Rabbit). Ranges through the Rocky Mountain region of South-eastern British Columbia (except the extreme south-eastern corner), and from Vernon, in the Okanagan, to Jasper House, Alberta.

Lepus washingtoni (Baird) (Washington Varying Hare). This hare occurs on the Coast from the Fraser River Valley to the western slope of the Cascade Mountains, at low altitude.

Lepus bairdi (Hayden) (Rocky Mountain Snow-shoe Rabbit). Distributed through the higher parts of the Rocky Mountains from Idaho south; a series of skins in the collection of the Provincial Museum from Cranbrook, B.C., collected by Mr. C. B. Garrett, are referred to in this species.

Lepus bairdi cascadensis (Nelson) (Cascade Mountain Snow-shoe Rabbit). Ranges from Hope, B.C., on the Fraser River, to the Okanagan, south on the east side of the Cascade Mountains into Washington.

Ochotonidæ.

Genus *Ochotona.*

The Pika, or Little Chief Hare, has the appearance of a miniature brown rabbit, although it represents an independent family, being neither a hare nor a rabbit. Its habitat is high up on the mountain ranges of the West, from near timber-line up to the line of perpetual snow.

They live among the caves and crevices of the rock-slides and are to be found sitting on the top of some prominent rock; at the least alarm they give a shrill call and disappear into their retreats, only to appear again to see if the intruder has gone away.

These little animals are very industrious, and work constantly through the day, gathering grass and various alpine plants, which are piled up (like miniature stacks of hay) among the rocks for their winter use.

The series of skins in the collection of the Provincial Museum are all from the Mainland of the Province, and have recently been identified by Mr. Howell, of the Biological Survey, United States Department of Agriculture, Washington, D.C.

So far as is known, there is no record of the genus occurring on Vancouver Island; although it is quite possible that biological research in our Alpine-Arctic zones may add this mammal to the fauna of Vancouver Island.

Species known to occur in British Columbia are as follows:—

Ochotona princeps princeps (Richards). Distributed throughout the Rocky Mountains in British Columbia, northward to the South Branch of the Mackenzie River.

Ochotona collaris (Nelson). This is a northern species found in the mountains from south of Fort Yukon, including Atlin District, Northern British Columbia. The two skins in the Museum collection from White Mountain, Moose Arm, Tagish Lake, Atlin, presented by the late F. H. Mobley, M.P.P., are identified as this species.

Ochotona cuppes (Bangs). Throughout the Gold Range, British Columbia. Type locality, Monishe Divide.

Ochotona fenisex. Distributed through the Okanagan and Tulameen, the data of skins in the Museum collection recording an altitude of from 3,500 to 4,000 feet.

Ochotona fenisex brooksi. Skins recorded from Sicamous to Mount McLean, Lillooet. A comparatively new subspecies ranging through the Cascades.

Ochotona minimus (Lord). Distribution in British Columbia near the boundary-line. Limits of range unknown. Type from Ptarmigan Hill, Cascade Range, B.C.

ORNITHOLOGY.

Birds.—In this branch considerable work has been carried on throughout the year with the study series, ten new specimen sectional storage-cases having been added. The collection has been considerably worked over and made more accessible for students, and at the present time we are installing another sixteen sectional cases to take care of the balance of the valuable study skins, which have been stored in boxes and were not very accessible to those persons who wished to consult our large bird-skin collection of the birds of this Province.

Since Mr. J. W. Gibson, the Director of Elementary Education, has inaugurated his nature-study in the public schools of this Province, considerable call has been made on the Museum, more particularly in the study of bird-life. Numbers of classes have been brought here by their teachers, and the Director and his assistants have given all the possible instruction to these young students in their study of ornithology. The Department has also loaned a number of skins to several of the school-teachers upon request, so that they should have them handy for instructions in their nature-study at different times during the school term.

This, however, is not very satisfactory, on account of breaking into the series that should not really be loaned out for this purpose. It would be a capital idea if the Department of Education would take up the matter of having small collections of mounted specimens under their own jurisdiction; these to be sent round from school to school throughout the Province in cities and towns and districts where there are no measures similar to the Natural History Museum in Victoria. This would assist the children greatly in their identification of species, and also give them an idea of what to look for in their rambles throughout the country.

Numbers of requests come from time to time from other museums for the loan of ornithological material for study by specialists who are working out the exact species and subspecies, that vary so in different portions of America, according to geographical conditions.

Mr. J. Grinnell, Director of the Museum of the University of California, wrote this year asking permission of the Provincial Museum to loan to Mr. Harry S. Swarth, ornithologist of their Department, our collection of bird-skins of the genus *Passerella* (fox-sparrows), as he is working on a monograph of this species and is very anxious to secure the specimens from this northern portion of the country. Twenty specimens of this genus were loaned for comparison and have been returned—namely, three *P. i. townsendi*, four *P. i. fuliginosa*, two *P. i. meruloides*, five *P. i. sinuosa*, and six *P. i. altivagans*.

OOLOGY.

During the year the Provincial Museum was very fortunate in having a magnificent collection of birds' eggs presented by Mr. W. F. Burton, of this city.

Mr. Burton is an enthusiastic student of bird-life and a careful collector. He has added a number of sets of eggs not heretofore represented in the Oological division in the Museum. It has been the request of the donor that these specimens be exhibited in a case and kept by themselves as the W. F. Burton collection.

List of Eggs in the Burton Collection.

No. of Eggs in Set.	Set with Nest.	Species.	Common Name.
2	...	*Gavia immer* (Brunnich)	Loon.
1	...	*Gavia stellata* (Pontoppidan)	Red-throated Loon.
1	...	*Lunda cirrhata* (Pallas)	Tufted Puffin.
1	...	*Cerorhinca monocerata* (Pallas)	Rhinoceros Auklet.
1	...	*Ptychoramphus aleuticus* (Pallas)	Cassin's Auklet.
1	...	*Æthia pusilla* (Pallas)	Least Auklet.
2	...	*Synthliboramphus antiquus* (Gmelin)	Ancient Murrelet.
3	...	*Cepphus columba* Pallas	Pigeon Guillemot.
4	...	*Uria troille californica* (H. Bryant)	California Murre.
2	...	*Rissa brevirostris* (Bruch)	Red-legged Kittiwake.
3	...	*Larus glaucescens* Naumann	Glacous-winged Gull.
3	...	*Larus atricilla* Linnæus	Laughing Gull.
3	...	*Sterna caspia* Pallas	Caspian Tern.
3	...	*Sterna hirundo* Linnæus	Common Tern.
1	...	*Diomedea albatrus* Pallas	Short-tailed Albatross.
1	...	*Fulmarus rodgersi* Cassin	Rodger's Fulmar.
1	...	*Puffinus tenuirostris* (Temminck)	Slender-billed Shearwater.
1	...	*Oceanodroma furcata* (Gmelin)	Forked-tailed Petrel.
1	...	*Oceanodroma leucorhoa* (Vieillot)	Leach's Petrel.
1	...	*Oceanodroma melania* (Bonaparte)	Black Petrel.
1	...	*Oceanodroma socorrænsis* C. H. Townsend	Socorro Petrel.
3	...	*Phalacrocorax penicillatus* (Brandt)	Brandt's Cormorant.
4	...	*Phalacrocorax pelagicus robustus* Ridgway	Violet-green Cormorant.
3	...	*Pelecanus californicus* Ridgway	California Brown Pelican.
4	...	*Branta canadensis canadensis* Linnæus	Canada Goose.
4	...	*Botaurus lentiginosus* (Montague)	Bittern.
3	...	*Ardea herodias fannini* Chapman	Northwestern Coast Heron.
3	...	*Nycticorax nycticorax nævius* (Boddært)	Black-crowned Night Heron.
1	...	*Grus mexicana* (Muller)	Sandhill Crane.
8	Nest	*Rallus virginianus* Linnæus	Virginia Rail.
4	...	*Recurvirostra americana* Gmelin	Avocet.
2	Nest	*Gallinago delicata* (Ord)	Wilson's Snipe.
3	„	*Actitis macularia* (Linnæus)	Spotted Sandpiper.
4	„	*Numenius americanus* Bechstein	Long-billed Curlew.
4	„	*Oxyechus vociferus* (Linnæus)	Killdeer.
4	...	*Ægialitis semipalmata* (Bonaparte)	Semipalmated Plover.
11	Nest	*Lophortyx californica californica* (Shaw)	California Quail.
7	„	*Dendragapus obscurus fuliginosus* (Ridgway)	Sooty Grouse.
7	„	*Bonasa umbellus sabini* (Douglas)	Oregon Ruffed Grouse.
2	...	*Cathartes aura septentrionalis* Wied	Turkey Vulture.
2	...	*Elanoides forficatus* (Linnæus)	Swallow-tailed Kite.
5	...	*Accipiter velox* (Wilson)	Sharp-shinned Hawk.
3	...	*Buteo borealis calurus* Cassin	Western Red-tailed Hawk.
2	...	*Buteo lineatus elegans* Cassin	Red-bellied Hawk.

LIST OF EGGS IN THE BURTON COLLECTION—*Continued.*

No. of Eggs in Set.	Set with Nest.	Species.	Common Name.
3	....	*Archibuteo lagopus sancti-johannis* (Gmelin) ...	Rough-legged Hawk.
2	...	*Aquila chrysaëtos* (Linnæus)	Golden Eagle.
2	...	*Haliæetus leucocephalus leucocephalus* (Linnæus)	Bald Eagle.
4	...	*Falco peregrinus pealei* Ridgway	Peale's Falcon.
5	...	*Falco sparverius sparverius* Linnæus	Sparrow Hawk.
3	...	*Pandion haliaëtus carolinensis* (Gmelin)	Osprey.
4	Nest	*Otus asio kennicotti* (Elliot)	Kennicott's Screech Owl.
3	...	*Bubo virginianus pacificus* Cassin	Pacific Horned Owl.
4	Nest	*Dryobates villosus harrisi* (Audubon)	Harris's Woodpecker.
7	„	*Dryobates pubescens gairdneri* (Audubon)	Gairdner's Woodpecker.
5	„	*Sphyrapicus ruber notkensis* (Suckow)	Northern Red-breasted Sapsucker.
4	„	*Phlœotomus pileatus abieticola* (Bangs)	Northern Pileated Woodpecker.
6	„	*Asyndesmus lewisi* Riley	Lewis's Woodpecker.
2	„	*Calypte costæ* (Bourcier)	Costa's Hummingbird.
2	„	*Selasphorus rufus* (Gmelin)	Rufus Hummingbird.
4	„	*Nuttallornis borealis* (Swainson)	Olive-sided Flycatcher.
3	...	*Empidonax wrighti* Baird	Wright's Flycatcher.
5	Nest	*Cyanocitta stelleri stelleri* (Gmelin)	Steller's Jay.
4	„	*Spinus pinus* (Wilson)	Pine Siskin.
4	„	*Junco hyemalis oreganus* (J. K. Townsend)	Oregon Junco.
4	„	*Passerella iliaca fuliginosa* Ridgway	Sooty Fox Sparrow.
4	„	*Pipilo maculatus oregonus* Bell	Oregon Towhee.
4	„	*Zamelodia melanocephala* (Swainson)	Black-headed Grosbeak.
4	„	*Passerina amœna* (Say)	Lazuli Bunting.
4	„	*Piranga ludoviciana* (Wilson)	Western Tanager.
4	„	*Vireosylva gilva swainsoni* (Baird)	Western Warbling Vireo.
5	„	*Lanivireo solitarius cassini* (Xantus)	Cassin's Vireo.
4	„	*Vermivora celata lutescens* (Ridgway)	Lutescent Warbler.
4	„	*Dendroica auduboni auduboni* (J. K. Townsend)	Audubon's Warbler.
4	„	*Oporonis tolmiei* (J. K. Townsend)	Macgillivray's Warbler.
3	„	*Wilsona pusilla pileolata* (Pallas)	Pileolated Warbler.
5	„	*Cinclus mexicanus unicolor* Bonaparte	Dipper.
5	„	*Thryomanes bewicki calophonus* Oberholser	Seattle Wren.
5	„	*Nannus hiemalis pacificus* (Baird)	Western Winter Wren.
6	„	*Certhia familiaris occidentalis* Ridgway	California Creeper.
7	„	*Sitta canadensis* Linnæus	Red-breasted Nuthatch.
7	„	*Sitta pygmæa pygmæa* Vigors	Pygmy Nuthatch.
8	„	*Penthestes rufescens rufescens* (J. K. Townsend)	Chestnut-backed Chickadee.
5	„	*Regulus satrapa olivaceus* Baird	Western Golden-crowned Kinglet.
5	„	*Myadestes townsendi* (Audubon)	Townsend's Solitaire.
3	„	*Hylocichla guttata guttata* (Pallas)	Alaska Hermit Thrush.
3	„	*Hylocichla guttata sequoiensis* (Belding)	Sierra Hermit Thrush.
4	„	*Ixoreus nævius nævius* (Gmelin)	Varied Thrush.
7	„	*Sialia mexicana occidentalis* J. K. Townsend ...	Western Bluebird.

FISHES.

Early in February the Director sent a specimen of the broad-fin cod (*Zaniolepis latipinnis*) to Dr. C. H. Gilbert, Department of Zoology, Stanford University, California, for verification. It was a very peculiar fish with the tail lacking.

Later I received from Dr. Gilbert the following: "I have received your specimen sent for identification and return it to-day. It proves to be a mutilated specimen of *Zaniolepis latipinnis*. It seems a marvel that a fish, left apparently without means of locomotion, should be able to make its way in the world and to reach an adult condition as well nourished as this seems to be. I do not recall having seen a similar case in the course of my long experience of fishes."

This peculiar specimen was taken by one of Watson's seine-boats in Stamp Harbour, near Alberni, V.I., and was presented to the Museum by Mr. A. A. Rhoades.

Mr. A. L. Hager, general manager of the New England Fish Company, Vancouver, who has always shown great interest in having his employees look out for rare specimens for the Museum, and through whose efforts several species have been added to the Provincial Museum collection,

wrote to the Director on February 11th, "that Mr. Walter White, for many years employed as a halibut-fisherman on the vessels of the New England Fish Company, and latterly as mate on the S.S. 'Kingsway' brought to their office a rock weighing about 2½ lb. Mr. White states that he personally took this rock from the stomach of a halibut weighing about 60 lb. The S.S. 'Kingsway' was fishing off Bonilla Island at the time in about 35 fathoms of water. It occurred to us that you might like to receive and preserve this rock."

This rock was eventually sent to the Provincial Museum by Mr. Hager. Later I sent a copy of the letter, as requested by Mr. Hager, to Mr. Will F. Thompson, Assistant in charge of the Long Laboratory, California, for his information.

Mr. Thompson is a well-known fish expert on the halibut fishes, and has done considerable scientific research-work in the Northern British Columbia halibut waters. In reply, Mr. Thompson writes as follows:—

"Many thanks for your letter with the copy of the note on the rock swallowed by the halibut. It is perfectly possible. The halibut are famous eaters of small things, and they pick from the ground, rocks, etc., and all sorts of things, including sea-anemones, clam-siphons, etc., and in the process of doing so they frequently take in many things which are not intended to find a lodging in the stomach of fish. The famous stones which the cod takes in (as ballast) in storms are the results that follow too reckless eating on the part of the cod. The size of the stone, however, is a most surprising thing. It bears witness to the reckless habits of the halibut."

The Museum also received a specimen of a fish, donated by Mr. Harry Pidcock, Quathiaski Cove, B.C., which appears to me to be that of an immature alligator fish (*Podothecus acipenserinus*), but this has not been verified by an authority.

The Department also received a specimen of an immature pipe-fish (*Aulorhynchus flavidus*), presented by Mr. H. A. Cox, Esquimalt, B.C. A small species of fish (*Sebastodes* sp.?) was also presented by Mr. A. S. Grice on July 30th, 1919.

This specimen I have not fully identified, and it will have to be sent through to Dr. Gilbert, who has always shown a great interest and is willing to do any work in the identification of fishes for this Department.

BOTANY.

The whole collection in the Herbarium has been numbered consecutively, and all duplicates correspondingly numbered and catalogued. This will eliminate a great disadvantage in connection with any correspondence concerning any particular species.

The number of mounted specimens in the collection of flowering plants at the present time is approximately 6,000. For some time past there have been many requests for a Check-list of the Flora of Vancouver Island, and it was deemed by the Director desirable to prepare the same. This entailed a considerable amount of work in the research of the earliest records of botanical collectors on the Pacific Coast.

The manuscript for this work, which was compiled by Mr. W. R. Carter, has now been completed, and it is to be hoped that the Department will be able to have it in the press before long. This Check-list also includes the plants known to occur on the islands adjacent, together with the Queen Charlotte Group.

Through the kindness of several collectors, a small number of specimens have been added to the collection, and thanks must be extended to the following gentlemen for the same:—

Professor J. K. Henry, for a small series collected in the Sicamous and adjoining districts, including: *Mentzelia albicaulis* Dougl.; *Gilia pharnaceoides* Benth.; *Castilleа lutescens* (Greenman) Rydb.; *Utricularia intermedia* Hayne; *Chænactis Douglasii* H. & A.; *Botrychium lunaria* (L.) Sw.; and *Lotus corniculatus* L. from Elgin, B.C.

Dr. C. F. Newcombe, for several rare specimens from the southern portion of Vancouver Island: *Tissa macrotheca* (Hornem) Britt.; *Ranunculus Lobbii* Gray; *Hosackia gracilis* Benth.; *Limnanthes Macounii* Trelease; also for access to his valuable botanical library in research of data difficult to obtain.

Mr. J. R. Anderson, for a large collection of plants, a few of which have made appreciable additions to the Herbarium, especially *Abronia acutalata* Standley and *Achillea californica* Poll., the latter a new record for Vancouver Island.

Among this collection were a number of specimens collected by his brother, Mr. W. B. Anderson, in various portions of the Province, which include: *Beckmannia cruciformis* (L.) Host.; *Chenopodium urbicum* L.; *Thelypodium integrifolium* (Nutt.) Endl.; *Gilia Hookeri*

Benth.; *Lupinus ornatus* Dougl.; *Pentstemon ovatus* Dougl.; *Anogra pallida* (Lindl.) Britt.; *Sphæralcea munroana* (Dougl.) Spach.; and *Tetradymia canescens* DC.

During the last summer a collection of plants was donated to the Museum by the authorities of the Mount Tolmie University School. This collection had belonged to the late Captain R. V. Harvey, who was one of the founders of the school. These plants, while mounted on small-size sheets, and in most instances showing little more than the inflorescence, can hardly be looked upon as Herbarium specimens.

Professor J. Macoun, senior Botanist of the Geological Survey of Canada, who has always taken a great interest in the Provincial Herbarium, and several years ago added to our collection over 900 named and classified specimens, mostly of the flora of Vancouver Island, has continued his great support to this division, and has made an offer to the Provincial Museum, subject to the approval of Mr. R. G. McConnell, Deputy Minister of Geological Survey, Ottawa, of a collection of Cryptogammes upon which he has been working and classifying for a considerable time.

The idea is for the Provincial Museum to take over for the time being the whole of his collection, with the understanding that a division be made on some future date (as there are a number of duplicates of each species) between this Department and the Department at Ottawa.

Both Professor Macoun and J. M. Macoun, C.M.G., Chief of the Biological Division of the Department of Mines, Ottawa, have always shown a great interest in the Provincial Museum, and have done a great deal of work, more particularly in the Botanical section, in the identification of plants from every section of this Province.

Mr. J. M. Macoun has also been filling in blanks in our collection from time to time from the Ottawa collection and from a number of plants that both he and his revered father have collected throughout British Columbia in their botanical survey of Canada. The Provincial Museum has at different times sent many specimens (of which a number at present are still there) to Ottawa to be verified by Mr. Macoun. These specimens, it is to be hoped, will be returned in due course.

IN MEMORIAM.

Mr. J. M. Macoun, C.M.G., Chief of the Biological Survey Department, Ottawa, died on January 8th, 1920. The late Mr. Macoun was one of the highest authorities on botanical research in Canada. He was a faithful and courageous public servant and a man of high standing in scientific research. His loss will be keenly felt not only by the Department with which he had been so long connected, but also by the Provincial Museum in Victoria, to which he was a constant visitor when on the Pacific Coast.

ENTOMOLOGY.

The Museum collection during the year has been greatly enriched by the donation of the valuable collection of the late Captain R. V. Harvey, which was donated by the authorities of the Mount Tolmie University School. This collection is especially rich in Diptera, of which the late Captain Harvey was a recognized authority in British Columbia.

The Coleoptera and Hymenoptera collections are also particularly acceptable, and, as they are representative of the whole of Southern British Columbia, they will enable us to enlarge and extend our own collections in these orders. Provision is being made for the incorporation of these collections with those already existing in the Museum, and when finally installed they will prove of incalculable value to students.

The thanks of the Department are due to Mr. E. H. Blackmore, President of the British Columbia Entomological Society, for his valuable services, which were instrumental in securing this highly desirable collection for this institution.

Mr. Blackmore has always done considerable work in the Entomological division of this Department, both in identification and arranging the collection for study and inspection, and he has also written the following paper on entomology.

ENTOMOLOGY.

BY E. H. BLACKMORE, F.E.S.

Practically no entomological field-work of any description was undertaken by any of the Museum staff during the past season, and therefore there is not so much as usual to write about in connection with the actual work of the Museum. I have, however, been able to gather a few

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PLATE I.

LYCAENIDÆ, HESPERIIDÆ, AND ARCTIIDÆ.

Plebeius icarioides blackmorei B. & McD.
(Male paratype.)
Goldstream, B.C. (E. H. Blackmore).
(New to science.)

Plebeius icarioides blackmorei B. & McD.
(Female paratype.)
Goldstream, B.C. (E. H. Blackmore).
(New to science.)

Plebeius icarioides blackmorei B. & McD.
(Under-side male.)
Goldstream, B.C. (E. H. Blackmore).

Plebeius icarioides pembina Edw.
(Under-side male.)
Rossland, B.C. (W. H. Danby).

Heodes cupreus Edw.
Lillooet, B.C. (A. W. A. Phair).
(New to British Columbia.)

Callipsyche behri Edw.
Osoyoos, B.C. (W. B. Anderson).
(Very local.)

Mitoura spinetorum Bdv.
Fairview, B.C. (W. B. Anderson).
(Very rare.)

Hesperia centaureæ Ramb.
Atlin, B.C. (E. M. Anderson).
(New to British Columbia.)

Apantesis blakei diecki Neum.
Lillooet, B.C. (A. W. A. Phair).
(New to British Columbia.)

Neoarctia beani Neum.
Kaslo, B.C. (J. W. Cockle).
(New to British Columbia.)

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interesting facts from other workers in the Province; a little more previously undetermined material has been worked over; and these, together with some of my own captures, will enable us to present a fairly comprehensive account of the work done in the Province in this particular branch of science during the year 1919.

In last year's report mention was made of the remarkable scarcity of noctuids during that year, but this past season was far worse. In fact, this scarcity extended to all orders of insects, and was not confined to any particular district, but was noticeable in every section of the Province. There is no reasonable explanation that can be given of this sudden diminution of numbers, and even of species.

As usual, there were a few exceptions to the general rule, one of them being our old friend (?) the forest tent-caterpillar (*Malacosoma pluvialis* Dyar). The larvæ of this moth were particularly numerous in the early spring, even worse than the year previous, but fortunately before they became "full-fed" they were attacked by a disease—of a fungoid or bacterial origin—which killed them off in thousands.

In the south-eastern part of the Province, especially along the border, a great deal of damage was done by several species of locusts—one of the worst invasions we have had for many years. Mr. E. R. Buckle, of the Provincial Department of Agriculture, has been working in the infected area during the season, studying the conditions and using remedial measures with a view to preventing the occurrence of a further outbreak.

In the Report of the Provincial Museum, 1918, on page 12, is a note on the occurrence of *Hemerocampa vetusta gulosa* at Chase, B.C., in which the writer stated that the insect was double-brooded. This I find is not the case, as in a subsequent letter from Mr. R. C. Treherne, Dominion Field Officer for British Columbia, he remarks that from the data in his possession he is quite satisfied that this destructive insect is only single-brooded. It is interesting to note in this connection that Mr. W. B. Anderson found a slight outbreak at Armstrong during the past year in addition to the one reported from Chase the year previously, which latter had spread much farther than when first noted.

Rare and Uncommon Insects taken in British Columbia during 1919.

Owing to the dearth of insects in the Province during the past season, it would be only reasonable to suppose that this section of our report would be smaller than usual; nevertheless, quite a few items have been reported which are of more than passing interest.

Victoria.—In late May two worn specimens of that rather rare Sphingidæ, *Proserpinus clarkiæ* Bdv., were taken at rest on a peach-tree at Swan Lake. A very fine specimen of *Polia variolata* Sm. was taken by Mr. W. R. Carter on July 11th; this capture is exceedingly interesting in view of the facts set forth in last year's Museum Report, wherein this species was figured. The same collector also took a nice specimen of *Ipimorpha nanaimo* Barnes, to which, curiously enough, the same remarks apply.

In addition to the specimen of *Cucullia omissa* Dod, which is figured on Plate II., another specimen was taken in the Hollywood District by David Livingstone, a young and enthusiastic collector, who has kindly donated it to the Museum collection.

A male specimen of *Erebus odora* Linn. was captured the first week in October by Mr. W. R. Nairnes, of this city. It was taken about 4 o'clock in the afternoon of an exceedingly windy day, and at first sight Mr. Nairnes thought it was a large leaf being blown about. This is the first capture of this Florida "migrant" we have heard of for several years.

Goldstream.—The writer spent a few hours at the Goldstream Flats on July 20th, and amongst other interesting material obtained was a short series of *Epirrhœ alternata* Mull., a pair of *Dysstroma occidentata* Tayl., and a single specimen of *Stamnodes blackmorei* Swett.

Fitzgerald.—This station is situated about eleven miles north of Goldstream and is in the midst of a mountainous district. Mr. W. R. Carter, of the Museum staff, spent many week-ends in the locality and obtained many desirable species. Amongst the Diurnals several specimens were taken of both sexes of that rather uncommon little skipper, *Euphyes vestris* Bdv. The most interesting noctuids were *Euxoa ochrogaster gularis* Grt.; *Feltia herilis* Grt.; *Zosteropoda hirtipes* Grt.; *Septis multicolor* Dyar; and *S. plutonia* Grt. Amongst the geometers the following were of special interest: *Cosymbia lumenaria* Hbn.; *Diactinia silaceata albolineata* Pack.; *Eupithecia cretaceata* Pack.; *Drepanulatrix fœminaria* Gn.; and *Sericosema juturnaria* Gn. We are glad to have this last record, as very few specimens have been taken on Vancouver

Island, and this is the most southerly point yet recorded. Mr. A. W. Hanham, in a recent letter, tells me that he has a specimen given him by the late Rev. G. W. Taylor, labelled Cameron Lake, July 23rd, 1903, and Mr. G. O. Day writes me that he took one specimen at Cowichan Bay, July 7th, 1915. The date of the Fitzgerald specimen is June 15th. On the Mainland, anywhere from Lillooet to the Kootenays, this particular geometer is very abundant, some years being a perfect nuisance.

Maillardville.—This small settlement is about a mile from Fraser Mills and some five miles from New Westminster. Mr. L. E. Marmont, the Reeve of the district and an old-time entomologist, has taken some very interesting species there. The most desirable of the Noctuidæ are *Rynachgrotis gilvipennis* Grt.; *Trachea impulsa* Gn.; and *Bomolocha palparia* Wlk. (uncommon).

Mention must be made of two remarkable aberrations; one of *Namagana præacuta* Sm. is a peculiar melanic form, the ground colour of the primaries being of a dark sooty brown, with the orbicular, reniform, and s.t. line of a light-ash colour and standing out in startling relief. The other one is *Zale minera norda* Sm., and in place of the usual mottled appearance, with its abundance of fine wavy lines, the whole of the wings are light brown, being only relieved by a wide black t.p. line, black discal mark, and black basal area. Amongst the geometers taken, *Philobia ulsterata* Pears. in very uncommon, and we were glad to get the record of *Caripeta æqualiaria* Grt., taken on May 17th. This latter seems to be exceedingly rare, as we have very few records of its capture.

Lillooet.—During the first week in July Messrs. Day & Hanham, of Duncan, made a collecting-trip to Lillooet, and, although owing to the poor season the general result was rather disappointing, a few good specimens were taken, especially in the Geometridæ. Amongst some of the latter submitted to us for identification we noted the following: *Drepanulatrix unicalcararia* Gne. and its form *cervinicolor* Hlst.; *D. fœminaria* Gne.; and *D. carnearia* Hulst. The latter is an exceedingly good capture and is the first male and the third record we have from the Province, the other two being a female from Kaslo and another female from Ymir.

A single specimen was taken of *Dysstroma formosa* Hulst. This is the first record we have had of this for three years, Mr. A. W. Phair having taken a single specimen at the same place on June 23rd, 1916.

On looking over some material recently sent by Mr. Phair, we found a nice specimen of *Smerinthus cerisyi opthalmicus* form *pallidulus* Edw., taken on August 16th, 1919. This is the latest date we have of this form, although Mr. Cockle reports one taken at Kaslo on August 9th, 1901. Amongst the Noctuidæ, *Rynchagrotis vittifrons* Grt. and *cerapoda oblita* Grt. are the best. Up to the present we have no record of either of these species being taken in any other locality.

Spences Bridge.—Mr. W. A. Newcombe, who is connected with the Provincial Department of Fisheries, spent the latter part of August in this district, and in his spare time collected a little material, some of which was very desirable, noticeably *Euxoa costata idahœnsis* Grt.; *Rhizagrotis flavicollis* Sm.; and *Lycophotia nigra* Sm. The latter name has been used in many British Columbia collections for a somewhat similar species—*L. astricta subjugata* Dyar. The only other authentic records of *nigra* that we have besides this are from Armstrong, Rossland, and Kaslo. Only one geometer was taken, *Itame matilda* Dyar.

Quesnel Dam.—During September Mr. Newcombe spent a few weeks in this locality, but as the season was getting late nothing much was taken; however, we are always pleased to get material from here, as very little collecting has been done in this district. *Polygonia satyrus* Edw., *P. faunus rusticus* Edw., *Aglais j-album* Bdv. and Le C., were the only Diurnals taken. A short series of *Agrotis inopinatus* Sm. was captured, the only noctuid observed. Geometers were also scarce, three specimens of Dysstroma being all that were seen. Two of these belong to the *citrata* group, the other one being *D. formosa boreata* Tayl., which is a very rare form and one that we are pleased to receive.

Osoyoos.—In addition to the Diurnals mentioned under the heading of "Illustrated Lepidoptera," Mr. W. B. Anderson succeeded in getting a few specimens of *Marmopteryx marmorata* Pack. This is an exceedingly pretty geometer on the under-side, the marbled effect being especially striking. The first specimens we saw of this species were a pair collected by Mr. E. M. Anderson on May 7th, 1913, at Vaseaux Lake, just south of Penticton.

Fort Steele.—Mr. W. B. Anderson took the first specimen of *Euptoieta claudia* Cram. recorded from British Columbia on September 23rd, 1919. This is a most interesting record, and we are glad that Mr. Anderson, who is a most indefatigable worker, has added this to our list of

British Columbia butterflies. It belongs to the family Nymphalidæ and is closely allied to the genus *Argynnis*. It has a wide distribution throughout the United States and South America, being essentially a southern insect.

New British Columbia Insects.

The following ten insects have been described as new to science during the year 1919, and comprise seven species of Lepidoptera, two species of Diptera, and one of Thysanoptera.

Lepidoptera.

Plebeius icarioides blackmorei Barnes & McDunnough is described in the Can. Ent., Vol. 51, p. 92, April, 1919, from a number of specimens taken by the writer at Goldstream on May 31st, 1918. More extended remarks on this new race will be found under the heading of "Illustrated Lepidoptera."

In the Journal New York Ent. Socy., Vol. XXVII., Nos. 2 and 3, June and September, 1919, Dr. R. Ottolengui describes several new species and races of the genus *Autographa* (Noctuidæ), amongst which are two from British Columbia. *Autographa magnifica* described from a single female taken at Ucluelet, on the west coast of Vancouver Island. It was taken by a member of the Forestry Branch of the Dominion Department of Agriculture. The type is in the Canadian National Museum at Ottawa.

The other is *Autographa rectangula nargenta* and was described from material belonging to Mr. J. W. Cockle, of Kaslo, B.C., and Mr. A. W. Hanham, of Duncan, B.C. This is the *rectangula* of our check-lists, which is really an Eastern species.

The chief distinguishing characteristic of this new race is the transverse posterior line, which is distinct and geminate, the space between being filled with silver.

In the Lepidopterist, Vol. 3, No. 2, p. 105 *et seq.*, July 15th, 1919, Messrs. Swett & Cassino describe four species of geometers belonging to the genus *Eupithecia*. Two of these are from British Columbia, viz.: (1) *Eupithecia probata*, described from specimens taken at Duncan and Victoria, and (2) *Eupithecia moirata*, taken by E. M. Anderson at Penticton in 1913. Both these new species will be treated of more fully under the same heading as the preceding.

Microlepidoptera.

In the Proc. Ent. Socy. Wash., Vol. 21, No. 3, March, 1919, under the title of "Two Microlepidoptera injurious to Strawberry," Mr. August Busck describes two new "Micros" from specimens taken by Mr. W. Downes, Dominion Junior Entomologist at Victoria, B.C. The first is *Tortricodes fragariana*, and, according to the author, is the first published record of this genus in North America. Mr. Downes says that this species breeds commonly in the buds at the head of the crowns of strawberry.

The second is *Aristotelia fragariæ*, and, according to Mr. Busck, is the so-called "strawberry-crown borer," on which there is considerable economic literature, but which had not previously received a specific name. The first species belongs to the family Tortricidæ and has the fore wings brownish fuscous in colour, overlaid with black and reddish scales; the hind wings are much lighter, being a silvery grey. It is a small moth measuring 17 mm. in alar expanse. The second species, *Aristotelia fragariæ*, is a member of the family Gelechiidæ and is a much smaller insect, being only 12 mm. in width when spread. In colour it is dark brown, with the hind wings lighter.

Diptera.

In an article on "The Streptocera Group of the Dipterous Genus Tipula Linn," Annals Ent. Socy Amer., Vol. 12, No. 2, p. 84, June, 1919, Dr. W. G. Dietz describes some half-dozen new species, one of which is recorded from Victoria, B.C., under the name of *Tipula trypetophora*. It is described from nine specimens, two males and seven females, all from Victoria, and apparently on the same date, July 6th, 1912, but who the captor was is not stated. This is one of the crane-flies.

Mr. Jas. S. Hine, in an exhaustive review of the "Robber-flies of the Genus Erax" (*idem*, p. 103), describes quite a number of new species in the various groups of this genus.

One amongst them is particularly interesting to us, as the two specimens from which they were described were taken by the late Captain R. V. Harvey at Vernon in August, 1904. The

species, which belongs to "The Aridus Group," has been named by Mr. Hine *Erax harveyi* in honour of its collector.

Thysanoptera.

In a very interesting article on "Western Thysanoptera" by R. C. Treherne, Dominion Assistant Entomologist for British Columbia, in Can. Ent., Vol. 51, p. 181, August, 1919, a new species of Thrips is described from this Province under the name of *Ælothrips auricestus*. The type material consists of nine macropterous females taken by the author from the western wild rye-grass (*Elymus condensatus*) at Vernon and Kelowna in July, 1917. The author of the above article is to be congratulated for the able and painstaking manner in which he has collected and presented the known facts, augmented with his own observations, of the different species belonging to this order occurring in British Columbia, some of which are of great economic importance. The paper is illustrated with two plates, which add greatly to its usefulness.

ILLUSTRATED LEPIDOPTERA.

In continuation of the idea expressed last year, of describing more fully the insects illustrated in the Annual Report, we are acting in accord with the declared wishes of the active entomologists of this Province, as the commendatory letters we have received during the past year fully testify. As stated in last year's Annual Report, the numbers appearing before each name correspond with a similar number in Messrs. Barnes & McDunnough's Check-list of North American Lepidoptera, February, 1917. Those with a star prefixed to them have been described during the year 1918.

Diurnals (Plate. I.).

372. *Mitoura spinetorum* Bdv. This is one of our butterflies which appears to be more or less local. Until quite recently only two or three specimens had been taken in the Province—two, I believe, at Fairview and one at Kaslo. In a recent letter, Mr. J. W. Cockle, of the latter place, remarks that he has taken a second specimen. Mr. Walter B. Anderson, Dominion Inspector of Indian Orchards, while on a trip in the Boundary country early last June, took a short series at Fairview and a few days later took two more at Penticton. It is an easily recognized insect, as on the upper side it is nearly black in colour, with the basal half of the wings shot with bluish-green. The under-side is reddish-brown, with the contrasting white lines which is characteristic of this subfamily. A figure is given of the under-side, showing the arrangement of the lines, which differ somewhat from its close ally, *Mitoura nelsoni*, which occurs on Vancouver Island and the Lower Fraser Valley.

394. *Callipsyche behri* Edw. is apparently more local than the preceding one, and so far has only been taken in one district in the Province—namely, the Osoyoos District. There is a strip of land extending from the boundary-line to Penticton (and including Osoyoos, Fairview, Dog Lake, and Vaseaux Lake) which is the extreme tip of the Upper Sonoran fauna, and many insects are taken in this district which do not occur in any other part of the Province.

It is rather a pretty butterfly, its colour on the upper side being a bright fulvous, with wide black-brown marginal bands. The specimen figured was taken by Mr. Anderson at Osoyoos in the first week in June. It is an inhabitant of Northern California and Oregon, extending eastward to Colorado.

411. *Heodes cupreus* Edw. Passing mention was made of this beautiful butterfly in the Report of the Provincial Museum, 1917, page 13. It was only recently that we were able to secure a good specimen for photographic purposes, and we are glad to illustrate this species, as it is entirely new to British Columbia, and, as far as the writer knows, has only been taken on Mount McLean, near Lillooet, at an altitude of between 7,000 and 8,000 feet. It was taken by Mr. A. W. A. Phair, an enthusiastic collector of Lillooet, who has done much to extend and enlarge our knowledge of the fauna of that district. It is a gorgeous little butterfly, being a bright coppery red, spotted with black. It is exceedingly rare, and previous to 1892 had been recorded from two localities only—namely, Mount Shasta, California, and Oregon. In that year Mr. W. G. Wright took three or four specimens at a high altitude in the Sierra Nevadas of California. It is closely allied to *Heodes snowi* Edw., which is duller in colour and not so heavily spotted. This latter is taken at Laggan, Alberta, in the Canadian Rockies, and also in the high mountain ranges of Colorado. We also have a specimen of this species in the Museum collection, taken at "Boom Pass"; this locality being a local name cannot definitely be placed, but is probably in the vicinity of Revelstoke.

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PLATE II.

NOCTUIDÆ AND GEOMETRIDÆ.

Cucullia omissa Dod.
Victoria, B.C. (E. H. Blackmore).
(New to Vancouver Island.)

Cucullia florea Gue.
Rossland, B.C. (W. H. Danby).
(New to British Columbia.)

Stretchia plusiæformis Hy. Edw.
Rossland, B.C. (W. H. Danby).

Stretchia muricina Grt.
Victoria, B.C., (E. H. Blackmore).

Cerma cuerva Barnes.
Victoria, B.C. (E. H. Blackmore).
(Very rare.)

Monodes festivoides Gue.
Lillooet, B.C. (G. O. Day).
(Very rare.)

Lygris testata Linn.
Quesnel Dam, B.C. (W. A. Newcombe).
(New to British Columbia.)

Thera otisi Dyar.
Kaslo, B.C. (J. W. Cockle).
(Very rare.)

Eupithecia probata Swett & Cassino.
Victoria, B.C. (E. H. Blackmore).
(New to science.)

Eupithecia moirata Swett & Cassino.
Penticton, B.C. (E. M. Anderson).
(New to science.)

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Plebeius icarioides blackmorei B. & MD. This new race was described by Messrs. Barnes & McDunnough in the *Canadian Entomologist*, April, 1919, page 92, from twenty-six specimens of both sexes sent to them by the writer, and taken at Goldstream on May 31st, 1918. In June, 1916, I captured about six specimens, mostly females, on a small hill some 700 or 800 feet high about three miles south of Goldstream; they were new to me, but later I found a pair in the Museum collection under the name of *Cupido pheres* and three specimens in the collection of Mr. A. J. Croker under the name *Cupido icarioides*. Upon further comparison I found that they were all conspecific and sent them to Messrs. Barnes & McDunnough for their opinion. Dr. McDunnough stated in his reply that it might prove a good geographical race, but would need a good series of both sexes to make sure. In June, 1917, I was collecting in the Lower Fraser Valley, and was therefore unable to be at Goldstream at the time of their emergence. The last two weeks of May, 1918, were extremely windy, and after waiting a whole week in vain for the wind to abate I decided to chance it, and in company with Mr. Arthur Robinson, of this city, went to Goldstream. Upon our arrival there the wind was blowing as furiously as ever, and the chances of capturing our prized "blue" seemed very remote. However, as we had come so far, we decided to walk the remaining three miles to the hill where I had taken them two years before. On the top of this elevation is an area of about an acre in extent, totally devoid of trees, and covered with blue lupines (*Lupinus columbianus* Heller), on which plant the larvæ of this butterfly feed. Upon reaching this spot the wind was still blowing hard, and the lupines were bent over at an angle of 45 degrees; the outlook was very discouraging, as we had had a long walk, and naturally there was nothing flying in such a wind. After being there a few minutes I noticed a "blue" butterfly hanging on for dear life to the stalk of a lupine that was swaying violently in the wind, and to my great delight it was the one we were looking for. We then commenced a diligent search, and in the course of an hour and a half "bottled" over forty specimens. This spot seems to be the headquarters of this species, as, although I have taken it in two other places in the general vicinity, it has only been very sparingly. On the Malahat, some eight miles north of Goldstream, on the side of a small mountain of some 1,200 feet elevation, there were acres and acres of this blue lupine, over which "blue" butterflies were swarming, and out of over a hundred that were captured only six proved to be this species. *Cupido pheres*, under which name this insect has gone for a number of years, is only known from the San Francisco Bay region and typical *icarioides* from the mountains of California.

433e. *Plebeius icarioides pembina* Edw. This is another of our blues that has been misidentified in British Columbia collections for many years, it having passed under the name of *fulla* in the 1904 Check-list, and under the name of *ardea* in Check-list issued in 1906. *Ardea* is now regarded as a race of *icarioides* from the Great Basin region (*vide* Cont. Lepid. No. Amer., Barnes & McDunnough, Vol. III., No. 2, page 114).

Arctiidæ (Plate I.).

946. *Neoarctea beani* Neu. This species is a new record for British Columbia, and was taken at "light" by Mr. J. W. Cockle at Kaslo on August 20th, 1919. This is one of the most interesting finds of recent years, as, although it was described over twenty-eight years ago (Can. Ent., Vol. 23, p. 123, June, 1891), I believe that this is the second specimen taken in the adult state. It was originally described from Laggan, Alberta, where Mr. T. E. Bean bred several specimens from estray larvæ which he had picked up in a full-fed state. During the four years that Mr. Bean spent in that district he only took one adult specimen, a male, on July 2nd, 1888, all the others being bred from estray larvæ, which he found feeding on willow, exclusively. In the Can. Ent., Vol. 36, p. 350, December, 1904, Wolley Dod writes of having a single specimen from Mr. Dean, dated July 9th, 1900; this was also bred from a larva found on willow. The only other record I can find of this species is in Gibson's Entomological Record for 1908, where he states that Mr. N. B. Sanson, of Banff, had sent him a larva of this species, found on Sulphur Mountain, the resulting imago emerging at Ottawa on June 15th. Mr. Cockle's specimen is a male in fine condition, and we are glad to be able to illustrate this, as he has done so much to work up the fauna of the Kootenay country; his untiring efforts for so many years have given us a large amount of knowledge which we otherwise would not possess.

987c. *Apantesis blakei diecki* Neu. The specimen illustrated was taken by Mr. A. W. Phair at Lillooet, but unfortunately bears no date. In Dr. Dyar's "List" (Bull. 52, U.S.N.M.) *diecki* is placed as a synonym of *determinata*, which is a race of *williamsi* Dodge, but in Cont. Lepid.

No. Amer., Barnes & McDunnough, Vol. III., No. 3, p. 159, the authors believe that *diecki*, along with our other British Columbia form *superba* Stretch, should be treated as a race of *blakei* Grt.

Unfortunately, very little material in this group is available from British Columbia, and until these various races can be bred from larva to imago, with notes on their larval and pupal stages, they cannot be definitely placed. *Diecki* was described in Amer. Ent., Vol. VI., p. 62, 1890, from Spences Bridge, B.C.

NOCTUIDÆ (PLATE II.).

1869. *Stretchia murician* Grt. We have illustrated this species, as it has been misidentified in nearly all British Columbia collections, and is generally placed under the name of *S. plusiæformis* Hy. Edw. The probable reason for this may lie in the fact that in Dr. Dyar's Catalogue (Bull. 62, U.S.N.M.) *muricina* is listed as a synonym of *plusiæformis*. There is a certain superficial resemblance between them, but they are easily separable by the following differences in maculation: In *muriciana* the pale terminal area of the primaries is sharply divided from the chestnut-brown of the rest of the wing, while in *plusiæformis* the bluish-grey outer area merges imperceptibly with the brown median band of the fore wing. Also the basal area of the latter species is of somewhat the same shade of grey as the outer area, while in *muricina* it is concolorous, with the rest of the wing, excepting the pale terminal area. In *plusiæformis* the thorax is light grey, with a distinct black collar; in *muricina* the thorax is light brown, with the patagia pale, and a narrow dark-brown colour; also in the former the fringes of the primaries are far more heavily checkered.

1871. *Stretchia plusiæformis* Hy. Edw. The specimen figured was taken by Mr. W. H. Danby at Rossland some twenty years ago, and a comparison of the two figures will show the differences that I have pointed out above. In our previous Check-lists *plusiæformis* is listed as being "generally distributed," but so far I have only seen the species from Rossland. It most likely occurs throughout the whole of that region and should be taken at Kaslo. *Variabilis* Sm., listed from Kaslo only, may be this species, but this I have not as yet seen; it was described from Colorado. *Muricina* was described from Oregon and should occur throughout British Columbia as far east as the Okanagan, but our material only indicates points on Vancouver Island and the Lower Fraser Valley.

1999. *Cucullia florea* Gn. This is another of Mr. Danby's captures from Rossland, and has not hitherto been recorded from British Columbia. The species in this genus have at all times been very difficult to separate satisfactorily, as many of them are closely allied, and although, as a rule, the species are rather uncommon, especially in the West, they have a very wide range. *Florea* is an Atlantic Coast species, its habitat being given as New York and New Jersey.

In the 1906 Check-list *obscurior* Sm. is listed from Kaslo and the Coast region. This species is now regarded as a race of *florea*. It is decidedly smaller and has much the same type of maculation, or lack of it, and is of a more even colour. We have only seen the species from Penticton and Lillooet, although Dr. Dyar records it from Kaslo in his "Kootenai" List, Proc. U.S.N.M., Vol. 27, p. 871.

2001. *Cucullia omissa* Dod. This species has been recorded from a greater number of localities in British Columbia than any other species of this genus, but the specimen illustrated is the first record of its being taken in Victoria. It was taken by the writer on June 27th, 1919, at rest on an electric-light pole and was in beautiful condition. This species was described by the late Wolley Dod in the Can. Ent., Vol. 48, p. 58, February, 1916. The type material came from a number of localities, including Nelson and Windermere, in British Columbia.

This species had been confused with *postera* Gue. (to which it is closely allied) for a number of years, and was listed from Kaslo under this name in previous British Columbia Check-lists. The known range of *omissa* in British Columbia is from Vancouver Island to the Rocky Mountains, and we have records from many intermediate points, including Princeton, Merritt, Kamloops, and Kaslo.

2412. *Cerma cuerva* Barnes. This is apparently a rather rare species. The writer has only taken two specimens in eight years—one on August 25th, 1916 (the specimen figured), and another one in rather poor condition some two or three years previous. As far as can be ascertained, it has not been taken at any other locality besides Victoria. It was described by Dr. W. Barnes (Can. Ent., Vol. 39, p. 10, January, 1907) from a single male specimen taken by Mr. A. W. Hanham in this city. It is rather a pretty insect, the fore wings being a dark

brown with an olive-green tinge, sprinkled with black and white scales. There is a specimen of this species in the Provincial Museum collection labelled *Cerma olivacea* Sm., and under which name it is listed in the British Columbia Check-list.

2608. *Monodes festivoides* Gn. This is another uncommon species as far as British Columbia is concerned. The specimen illustrated was taken by Mr. G. O. Day, of Duncan, while on a collecting-trip at Lillooet last July. It is recorded from Wellington and Kaslo, and I have not heard of it from any other locality. I have seen the Wellington specimen, and it is in a very ragged condition. It was taken on June 18th, 1904. Holland, in his "Moth Book," remarks that it is not uncommon in the Eastern States.

Geometridæ (Plate II.).

3979. *Lygris testata* Linn. This geometer is new to British Columbia and was taken by Mr. W. A. Newcombe at Quesnel Dam on September 2nd, 1919. This is a European insect, but occurs throughout the Atlantic States; it has also been reported from Calgary, Alberta, by Wolley Dod. In the U.S. Geo. Survey, Vol. 10, 1876, "Monograph of the Geometrid Moths," Packard gives Victoria, B.C., as a locality, which is evidently an error, as *propulsata* Walk. is the only species of this genus occurring on Vancouver Island.

3990. *Thera otisi* Dyar. The specimen figured is from the nimotypical locality and was taken by Mr. Cockle on August 27th, 1919. This is not by any means a common species, and even at Kaslo is not of regular occurrence. It is reported from Cameron Lake, but this, I believe, is meant for Mount Arrowsmith, as I have seen three or four specimens (in a very poor condition) taken by Mr. Theo. Bryant many years ago and labelled from that locality. I also have a note that I saw a specimen from Lillooet a year or so ago.

**Eupithecia probata* Swett & Cassino. This pretty little geometer was described from material collected by the writer at Victoria, B.C. This species is rather uncommon and has previously gone under the name of *nevadata* Pack., with which it has been confused for many years. It is one of the earliest of our "pugs" and is generally found in company with *E. ravocostaliata* Pack., appearing about the last week in March. I have never seen them on the wing, but have generally found them in the early morning at rest on electric-light poles. In eight years' collecting I have taken but ten specimens of this species; on the other hand, its congener, *ravocostaliata*, is fairly common.

**Eupithecia moirata* Swett & Cassino. This species had been previously identified by Mr. Swett as *implorata* Hulst, but a careful study of Hulst's type by the senior author has proved that this species is new, although closely allied. It differs from *probata* in its smaller size and dark fuscous wings. It was described from specimens taken by Mr. E. M. Anderson at Penticton on April 17th and 18th, 1913. It is evidently local, as I have not seen any other specimens since, although I have examined considerable material from there during the last three years.

VICTORIA, B.C.:
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1920.

PROVINCE OF BRITISH COLUMBIA

FOURTEENTH ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

FOR THE YEAR 1919

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AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
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1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to submit for your consideration herewith the Annual Report of the Department of Agriculture for the year 1919.

E. D. BARROW,

Minister of Agriculture.

Department of Agriculture,

Victoria, B.C., March 9th, 1920.

Horses and barn. J. Taylor, Rolla, Peace River, B.C.

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BRITISH COLUMBIA DEPARTMENT OF AGRICULTURE.

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DR. J. D. MCDONALD, Assistant Veterinary Inspector.
R. J. FERRIS, Silo Demonstrator.
W. H. STROYAN, Poultry Caretaker.
GEO. PILMER, Brand Recorder.
R. CAHILTY, Brand Inspector.
J. W. MCKINLEY, Foreman, 105-Mile Experimental Station.
C. PHELPS, Foreman, Quilchena Experimental Station.

Dairy Branch:

H. RIVE, B.S.A., Commissioner.
T. A. F. WIANCKO, Dairy Instructor and Inspector.
E. RIVE, Milk-tester.
J. B. WATSON, Milk-tester.

Foul-brood Inspectors:

W. J. SHEPPARD, Chief Inspector (Nelson).
F. D. TODD (Victoria).
L. HARRIS (Vernon).
W. H. TURNBULL (Lower Mainland).
A. W. FINLAY (Lower Mainland).
A. KEIR (Lower Mainland).

Publications Branch:

R. J. FERRIS, Editor.

Household Science Branch:

MISS OLIVE HAYES, Provincial Instructor and Demonstrator.

General:

A. H. SHOTBOLT, General Assistant.
D. E. MACKERETH, Carpenter.

Accountant's Branch:

W. T. ANDREWS, Chief Accountant.
R. E. MITCHELL, Assistant Accountant.
C. P. L. PEARSON, Assistant Accountant.

Clerical:

F. H. DAVEY.
R. MURRAY.
A. J. HOURSTON.
D. JOHNSON.
E. A. BOXALL.
E. DRUMMOND.
V. J. F. BABINGTON.
P. WARREN.
A. E. HILL.
N. EVANS.
G. HAWES.
M. G. BURNYEAT.
G. LINDSAY.
V. M. BRAKES.
M. LANDER.
A. P. WOODWARD.
K. MCRAE.
M. WALSH.
L. LEES.
F. M. LAWSON.

Women's Institutes:

MRS. V. S. MACLACHLAN, Secretary.

Ploughing in the month of February in the Lower Fraser Valley.

Cutting oats on Lulu Island, New Westminster District.

REPORT OF THE DEPARTMENT OF AGRICULTURE.

REPORT OF THE DEPUTY MINISTER OF AGRICULTURE.

D. Warnock, V.S., O.B.E.

Hon. E. D. Barrow,
Minister of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith the report of the Department of Agriculture for the year 1919.

Agricultural Conditions.

Following a mild winter, the spring of 1919 opened rather late and cool. The condition of the soil for early seeding was good, and ample rainfall induced a strong vegetation, which up till the end of June gave every indication of a heavy yield of hay and grain. Later, however, the precipitation was much below normal, resulting in very poor hay-crops in many areas of the Province, particularly in the Southern Interior. On Vancouver Island and the Lower Mainland the yield of hay was satisfactory. Grain-crops, too, suffered to some extent from drought, but were harvested in excellent condition and the quality of grain was good. In Central British Columbia crops were heavy, but the early advent of winter interfered with threshing operations and some of this work remains to be done in the spring. In spite of dry weather conditions, potatoes yielded a fair crop, but in the early fall met a slow demand at comparatively low prices. Later in the season, owing to the losses sustained by growers in the Prairie Provinces through the early onset of below-zero weather, there was a strong demand for British Columbia potatoes in Prairie markets and prices rapidly advanced. Southern buyers, too, have taken large quantities, with the result that the available supply of potatoes in the Province is much short of requirements and prices are extremely high.

Assistance to Stock-owners in Drought-affected Areas.

Towards late summer representations were made to the Department by stock-owners at a number of points in the Southern Interior to the effect that owing to prolonged drought there was a serious shortage of winter feed, and unless some relief could be afforded in procuring supplies of fodder from outside sources many owners would be compelled to sacrifice their stock. The situation was at once investigated by W. T. McDonald, Live Stock Commissioner, and his report confirmed the representations made by stock-owners.

At that time negotiations were in progress between the Provincial Governments of Alberta and Saskatchewan, the Federal Government and railway companies, for the purpose of formulating a plan to render assistance to stock-owners in the drought-stricken areas of the Prairie Provinces, and your Department made application to have British Columbia included, which was agreed to. Early in October winter set in with unprecedented severity on the Prairies; the situation became very alarming, as cattle had to be hand-fed much earlier than usual or had been anticipated, and local hay-supplies were rapidly being consumed. It was evident that the inadequate supplies of fodder on hand would not last long and it would be necessary to ship large quantities of hay into Alberta from Eastern points. Realizing that if severe winter conditions continued in the Prairie Provinces there would be little hay available from that source for the use of British Columbia stock-owners, your Department recommended that an independent policy of assistance to stock-owners be adopted to facilitate the procuring of hay, and this was authorized by the Government about the end of October. The policy in operation permits properly accredited stock-owners who met with crop-failures through drought to purchase fodder wherever they can procure it, the Government refunding one-third the amount of transportation charges on validation of the freight bills in the Department. Printed application forms furnished by the Department must be filled in by the applicant, stating the number of cattle, sheep, and work-horses owned by him, signed before a Commissioner for Oaths, countersigned by the local bank manager or clerk of the municipality, and returned to the Department with the receipted freight bills before a refund can be made. Many stock-owners who experienced crop-failure (some for the second time in two years) have availed themselves of the assistance offered,

and have been enabled to carry over the winter much valuable stock which, had help been denied, they would have been compelled to sacrifice.

LIVE STOCK.

Cattle.—Owing to the extreme drought conditions which prevailed in Southern Alberta last summer thousands of cattle from the ranching districts south of Calgary were thrown on the market, and farmers and stockmen of this Province availed themselves of the opportunity to purchase desirable stockers at greatly reduced prices. In addition to cattle purchased, many herds were shipped into Central British Columbia over the Grand Trunk Pacific Railway by Alberta stockmen, and much of the surplus fodder harvested in the recently settled areas has been fed to these cattle. Considerably more than 100 car-loads of cattle were shipped into Central British Columbia last autumn via Edmonton, and, in addition, many herds were driven into the Peace River country. The Department is in receipt of numerous inquiries from Prairie stockmen regarding suitable grazing areas in this Province, and there is every indication of a substantial increase in the number of cattle in the Province in the near future.

Prairie breeders of pure-bred stock, too, are becoming impressed with the advantages offered in British Columbia, and a number are investigating with a view to transferring a portion of their herds to this Province. The show and sale of bulls, principally of beef type, organized by the British Columbia Stock-breeders' Association, and held at Kamloops on March 25th last, was a great success. Alberta breeders exhibited a number of pure-bred Shorthorn and Hereford bulls and heifers which captured many prizes and sold at satisfactory prices, while the event proved an excellent advertising medium for the Province, as evidenced by the fact that a few months later some prominent Alberta owners had secured locations in the Okanagan Valley and had transferred some of their best breeding stock for the purpose of establishing registered herds. Provincial stockmen are beginning to realize the importance of good blood, and last fall a car-load of registered Aberdeen-Angus bulls and heifers was purchased in Manitoba by the Land Settlement Board and resold to ranchers in the Aspen Grove District. With more pure-bred herds in the Province and better facilities afforded for the purchase of registered sires, it is hoped that the scrub bull will be eliminated to a great extent, and the Department is preparing to conduct an educational campaign along this line.

Horses.—In spite of the great development of motor-traction, good heavy draught horses still command high prices and can be raised at a profit to the breeder. At the moment there is a decided reaction in favour of horse-traction, which is partly explained by the increased cost of motor-tractors as well as steadily advancing cost of maintenance and operation. Wideawake horse-breeders in the Western Provinces are already restocking their farms and ranches with mares and stallions of the best heavy draught type that money can buy, and are confident that the future of the industry is bright. Several Alberta and Saskatchewan owners of studs of heavy horses are looking for land suitable for horse-breeding purposes, with the intention of moving to British Columbia if desirable locations can be secured at reasonable prices. The small nondescript horse is now, practically speaking, valueless, and the breeding of such ought to be discouraged in every possible way, so that valuable grazing areas may be conserved for more profitable live stock.

Sheep.—Owing to drought conditions of the past season in the sheep-grazing areas south of the International Boundary, as well as in the Provinces to the east, numerous inquiries have been received from flockmasters concerning facilities offered in this Province. Several large owners from outside points have visited the Southern Interior, Vancouver Island, and the Central Interior investigating range conditions, and there are indications that the number of sheep in the Province will be materially increased during the coming year. Last summer some thousands of sheep were brought into the East Kootenay District from Alberta, but were shipped out again when winter set in.

Hogs.—In spite of the high cost of feed-grain and the attempt of the Board of Commerce Commission to fix the price of bacon, there has been an increase in the number of hogs in the Province, although at one time many breeders and feeders in face of discouraging conditions threatened to go out of business. With the Canadian Wheat Board endeavouring to increase the price of feed-grain on one hand, and the Board of Commerce forcing lower prices for hog products on the other, feeders for a time could see little profit in the business and many curtailed operations. In October last the Canadian Wheat Board ordered an extra charge of 10 cents per

bushel, approximately $3.35 per ton, on all feed-wheat shipped into British Columbia, which was a serious handicap to hog-feeders, poultrymen, and other buyers of low-grade wheat. On learning of this impost your Department at once took the matter up with the Wheat Board at Winnipeg, protesting what appeared to be discrimination against the live-stock interests of this Province, and after a week of negotiation the Chairman of the Board cancelled the order.

Goats.—This industry has made much progress during the past year, and it is estimated that there are now 3,500 milch goats in the Province, these providing much of the supply of dairy products in many homes. The many interesting exhibits of milch goats seen at the Victoria Home Products, Vancouver, and New Westminster Exhibitions last fall attracted much attention, and bulletins on goat-keeping issued by the Department are in much demand.

Poultry.—Poultry-raising has developed in a remarkable degree notwithstanding the high price of feed during the past year. Returned soldiers seem to favour this industry and many are investing in poultry-farms under assistance from the Soldiers' Settlement Board, although the high cost of feed will necessitate careful management if poultry-keeping is to be made a success. The report of J. R. Terry, Chief Poultry Instructor (attached hereto), includes a comparative table showing the increased cost of feed from 1913 to 1919. Poultry-breeders are taking much interest in the Egg-laying Contests now conducted in the Province, and valuable lessons are learned. Under present conditions, only by skilful management and rigorous "culling-out" of unproductive birds can the business be made profitable. The two poultry experts of the staff are extremely busy owing to the many calls for advice, and additional instructors are urgently required.

VETERINARY INSPECTION AND HEALTH OF ANIMALS.

On the whole, the general health of animals in the Province is excellent. During the year the officers of the Veterinary staff visited 2,068 premises and subjected 14,400 cattle to the tuberculin test, of which 573 reacted, and of the latter 445 were at once slaughtered, the remainder being held for retest. The percentage of reactors is comparatively low, and the health of British Columbia dairy stock will compare favourably with that of the stock of any other Province in the Dominion. All classes of live stock have been very free from outbreaks of contagious disease, and it is to be hoped that the contagion of cattle-mange has not been introduced through the many importations of range cattle from Alberta. However, every precaution was taken; all importations were carefully examined by Federal Veterinary Inspectors before being allowed to leave Alberta, while cattle from suspected ranges were dipped twice at intervals of ten days before shipment was permitted. But for these restrictions and risk of bad effects from dipping late in the season many more cattle would have been purchased in Alberta by British Columbia stockmen. It is hoped that other Provinces will, in the near future, co-operate with British Columbia in the endeavour to stamp out bovine tuberculosis, as new importations are a constant menace. The "accredited herd" plan for pure-bred dairy cattle now being established by the Federal Department of Agriculture is a step in the right direction, but Dominion-wide compulsory application of the test to all dairy cattle under supervision of the Federal Health of Animals Branch is, in my opinion, the only satisfactory method of combating tuberculosis. Recently, Provincial Veterinary Inspectors have been called upon to apply the test to dairy cattle about to be purchased by the Soldiers' Settlement Board, and, as the calls are generally urgent, the regular work of inspection is interfered with to some extent. Two additional Inspectors were appointed during the year, but others are required for the Central Interior districts.

DAIRYING.

This important industry has had to cope with some adverse circumstances, such as reduced yields of hay, root, and corn crops and high prices of mill-feeds. Subsequent to the removal by the United States of the embargo against the importation of Canadian wheat much of that grain has crossed the International Boundary, and as a consequence there is a shortage of by-products and prices have advanced. Prices of dairy products have been satisfactory to producers and there has been a large export trade. The industry is developing and there is a growing demand for good dairy stock. Last fall buyers from Central British Columbia visited the older districts of the Lower Mainland and made extensive purchases of dairy cattle for shipment north, but found difficulty in procuring enough to meet their requirements. Steps are

being taken by the Department to establish two creameries in Central British Columbia next spring. Henry Rive on his return from overseas service in July last was appointed Dairy Commissioner, and under his direction new Cow-testing Associations are being formed. Much valuable information is derived from systematic cow-testing, and through records revealed owners are enabled to eliminate unprofitable animals. Much improvement in the quality of British Columbia butter has been noted, due to improved methods and greater care in butter-making

HORTICULTURE.

Fruit-growers have had a very successful year, although they had to contend with adverse circumstances, such as the acute sugar shortage, box shortage, and other disabilities. From early summer sugar was difficult to procure in quantity sufficient to meet domestic requirements and there was little available for fruit-preserving purposes. In the early season growers themselves much underestimated the prospective fruit yield, and this error was responsible in a measure for the inadequacy of the box-supply in the late packing season. The box shortage, inadequate temporary storage facilities, and difficulty in procuring sufficient cars to transport the enormous apple-crop, all contributed towards late picking and indirectly caused considerable loss to growers. On October 10th and 11th a cold wave of unprecedented severity at that time of year struck the Okanagan Valley and ruined apples to the extent of thousands of boxes which were yet on the trees. From the experience of last year it would appear as if owners of large apple-orchards would be wise in providing more adequate temporary storage warehouses on their premises to meet emergencies which are likely to be costly. In April, 1919, Jas. A. Grant, Prairie Markets Commissioner, visited a number of the larger cities in the British Isles for the purpose of studying market conditions. As a direct result a number of leading wholesale fruit merchants visited British Columbia during the picking season and purchased freely, besides arranging to handle quantities of British Columbia fruit on commission on terms satisfactory to growers. During the season many car-loads of apples were exported to Great Britain, New Zealand, and other countries at remunerative prices, while the Prairie markets derived a large proportion of their supply from this Province. Last summer Superintendent Denison, of the Dominion Meteorological Service, visited the fruit-growing districts of the Southern Interior, collecting data with a view to formulating a plan for establishing frost-warning stations, which, it is thought, will be of great value in forecasting summer frosts sufficiently in advance to enable fruit-growers to take precautions towards guarding against damage. Mr. Denison is now endeavouring to perfect a plan in conjunction with Dominion and United States meteorological authorities.

FIELD-WORK.

During 1919 officers of the Horticultural Branch have been exceedingly busy and have accomplished much valuable work in the control and eradication of fruit pests and diseases. In the Okanagan Valley Ben Hoy and his staff carried out a very energetic campaign from the beginning of May till the end of November against the ravages of codling-moth, which is perhaps the most dangerous pest in that district. Approximately 223 acres of moth-infested orchards were dealt with under the supervision of Field Inspector H. H. Evans and good progress is reported.

In August last W. H. Robertson returned from overseas service, and on September 1st, although barely convalescent from the effects of a severe wound sustained in France, he returned to duty, taking charge of the Lower Mainland, relieving E. W. White of that area and enabling the latter to devote more attention to field and experimental work on Vancouver Island, where he has been investigating methods of rehabilitating strawberry-soils badly infested with strawberry-root weevil. The voluminous reports appended hereto by members of the Horticultural staff contain much interesting information.

HOUSEHOLD SCIENCE BRANCH.

This Branch was established in January, 1919, with Miss Olive E. Hayes as Provincial Instructor of Household Science. During the year many short course and lecture demonstrations in connection with Women's Institutes were held in various districts of the Province and were much appreciated. Exhibits demonstrating relative values of foods were displayed at New Westminster Exhibition and Victoria Home Products Fair under direction of Miss Hayes, and these attracted much attention. These demonstrations are very popular, and managers are already asking for displays at exhibitions to be held during 1920.

Land Settlement.

Many new settlers have secured locations along the Grand Trunk Pacific Railway in Central British Columbia, and many more will follow. These consist largely of pioneer farmers from the Prairie Provinces who have sold their farms at good prices owing to the increased demand for farm lands, and are attracted by the cheap and fertile lands of the Central Interior. The majority of these settlers are possessed of capital, understand the management of Prairie lands, and will make good. They are the class of settler the Province needs and will greatly assist in increasing agricultural production.

In 1919 the Province was visited by several eminent agricultural authorities from the United Kingdom, including Sir John Keen, Bart., and Christopher Turnor, Esq., the latter following up the work begun by Sir Rider Haggard. Mr. Turnor farms a large acreage in England and was Chairman of one of the Agricultural Committees in connection with the Greater Production Campaign in Britain during the war. Sir John Keen is prominent in agricultural circles in Ireland and is considered to be one of the leading authorities. Both gentlemen spent considerable time in the Province, visited many districts, investigating potentialities from an agricultural standpoint, and were much impressed with the opportunities offered for the settlement of British ex-service men.

The Agricultural Journal.

The *Journal* is becoming more and more appreciated and its circulation is now 8,500 monthly. It is well known beyond the boundaries of the Province and complimentary references by correspondents are not infrequent.

Scarcity of Agricultural Experts.

Much difficulty is met with in securing the services of properly qualified agricultural experts. During the war many students of agriculture enlisted and graduating classes have been small in numbers for several years. Technical men possessing practical experience are much sought after, both in Canada and the United States, and the supply is not nearly equal to the demand. Soldier settlement organizations in all Provinces, from Ontario West to the Pacific, are strong competitors with Departments of Agriculture for the services of good fieldmen, and there is likely to be a scarcity for some time.

Appended hereto are the reports of heads of branches and staff officials outlining in detail their respective activities.

Respectfully submitted.

D. Warnock,
Deputy Minister.

REPORT OF SECRETARY FOR THE DEPARTMENT OF AGRICULTURE.

WM. J. BONAVIA.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my report on the general work of the Department for the year ending December 31st, 1919.

STAFF.

The Estimates for the fiscal year ending 31st March, 1920, provided for fifty-two permanent officials of all ranks, being an increase of four over those for the preceding year. No appointments, however, were made for the office of Provincial Horticulturist or Agricultural Organizer. The year has again been marked by a considerable number of appointments to the staff, but fewer resignations than in 1918; the actual figures being twenty-four and five respectively.

APPOINTMENTS.

Date.	Name.	Appointment.	Remarks.
Jan. 1	Miss O. E. Hayes ...	Demonstrator, Domestic Science ...	
„ 24	Miss L. Lees	Stenographer	
Feb. 14	Miss M. Walsh	„	
March 4	G. H. Stewart	Clerk	Reinstated on return from overseas.
„ 17	T. M. Anderson	Acting District Field Inspector (Kelowna)	
„ 24	Miss M. Lauder	Stenographer (Kamloops)	
April 1	Dr. D. W. Warnock ..	Deputy Minister	
„ 4	F. J. Fleury	Clerk	Reinstated on return from overseas.
May 1	Miss E. W. Drummond	Stenographer	
June 6	Miss G. Lindsay	„	
„ 6	Miss V. Brakes	„	
„ 25	Jas. J. Mowat	Clerk (Vernon) (part time).	
July 2	E. A. Raines	Messenger	
„ 7	H. A. Brown	Veterinary Inspector	[overseas.
„ 14	H. Rive	Dairy Commissioner	Reinstated on return from
„ 16	L. Francis	Clerk	Ditto.
Aug. 4	J. C. McDonald	Provincial Veterinary Inspector ...	
Sept. 1	A. S. Rankin	Supervisor, Cow-testing (Dewdney).	[overseas.
„ 1	W. H. Robertson	Assistant Horticulturist	Reinstated on return from
„ 1	G. L. Foulkes	Clerk	Ditto.
„ 12	M. L. Bird	Assistant Inspector of Fruit Pests ..	„
Oct. 20	D. Johnson	Clerk	„
Dec. 1	C. B. Twigg	District Agriculturist and Field Inspector (Creston)	
	Miss A. P. Woodward	Stenographer (Duncan) (part time)	

Resignations.—The following resignations took place; G. H. Thornbery, Cow-tester, Courtenay, being granted leave of absence from October 31st, 1919:—

Date.	Name.	Appointment.	Remarks.
July 19	E. W. Hogan	Soil and Crop Instructor (Victoria)	Gone to Mexico.
„ 31	K. W. Munson	District Field Inspector (Chilliwack)	Taken up fruit-farming.
Aug. 2	H. A. Brown	Veterinary Inspector	
Oct. 22	L. Francis	Clerk	Gone to England.
„ 31	G. H. Thornbery	Cow-tester	Granted leave of absence.
Nov. 30	F. J. Fleury	„	Taken up farming.

Temporary Appointments.—A total of 130 temporary appointments were made during the year, as against seventy-five in 1918; twenty-two appointments being made under the provisions of the "Agricultural Instruction Act."

Provincial Estimates—		
Inspectors, Brands	1	
„ Imported Fruit	20	
„ Nursery Stock at Vancouver	5	
„ District Field Inspectors, Control of Fruit Pests, etc.	42	
Judges, Fall Fair Associations	24	
Women's Institute Lecturers, etc.	2	
Departmental exhibits	7	
Temporary clerical and stenographic work	7	
	—	108
"Agricultural Instruction Act"—		
District Agriculturist	1	
Assistant Horticulturist	1	
District Fruit Inspectors	2	
Foremen at Dry Farms	2	
Silo Demonstrator and Editor of *Agricultural Journal*	1	
Caretaker, Egg-laying Contest	1	
Supervisors, Cow-testing Associations	3	
Testers	4	
Assistant Plant Pathologist	1	
Assistant Entomologist	1	
Stenographers	4	
Messenger	1	
	—	22
Total		130

CORRESPONDENCE.

A total of 9,755 letters were received in this office, as against 8,390 in 1918, and 7,547 dispatched. A considerable increase was noted in the correspondence relating to Agricultural and Co-operative Associations. The correspondence for this section shows an increase of 31 per cent. over that of the previous year.

Appendix No. 1 shows the whole correspondence received and sent out from the Department at Victoria.

Circular Letters.—The total number of circular letters sent out during the year was 39,675, this being almost a 50-per-cent. increase over the figures for the previous year. For convenience these circulars have been grouped as per attached list:—

Agricultural Associations	425
Dairy Division	3,530
Farmers' Institutes	7,210
Goat-breeders' Association	6,480
Horticultural Branch	600
Miscellaneous	9,715
Poultry Branch	4,125
Stock-breeders' Association	655
Statistics Branch	1,745
Soil and Crop Division	150
Women's Institutes	5,040
Total	39,675

PUBLICATIONS.

There was a considerable increase in the issue of new publications and reprints during the year, there being an exceptional demand from persons both in the Province and intending settlers from other parts of the Dominion and the United States. The monthly publication of the Department, the *Agricultural Journal*, is also now well established as the leading farm journal for the Province; the total number of copies for the year being 84,700, the average monthly

circulation being 7,058 copies, or an increase of 16 per cent. over the circulation in 1918. The new publications issued were as follows:—

Date.	Name.	Description.	No.
1918.			
Dec. 9	Bulletin No. 23 and Maps ..	Handbook of British Columbia	5,000
1919.			
Jan. 7	Dept. Circ. No. 22	City and Suburban Food Production, 1918	1,000
„ 16	Insect Notes	For Year 1918	300
„ 21	Circ. No. 51	Orchard Cover-crops	1,000
Feb. 15	Farmers' Institute Report ..	District A Conference	250
„ 25	Circ. No. 20	Instructions *re* keeping Records of Farm Products	200
„ 25	Bulletin No. 81	Boys' and Girls' Competition, 1919	1,500
March 8	Agric. Dept. Circ. No. 23 ...	Honey Production in 1918	2,000
„ 18	Circ. Nos. 24, 25, and 26 ...	Household Science Branch, *re* Food for Children	3,000
„ 29	Bulletin No. 82	Agricultural Statistics for 1918	1,000
„ 31	Report	Department of Agriculture, 1918	1,000
April 15	Bulletin No. 27 (4th Ed.) ..	The Climate of British Columbia	5,000
„ 26	Circ. Bulletin No. 23	Peas and Oats for Silage	4,000
„ 28	Farmers' Institute Report ..	Also Meeting with Agricultural Committee	500
May 22	Agric. Dept. Circ. No. 28 ...	Fruit: Selection and Preparation of Plate Exhibits	1,000
„ 22	Agric. Dept. Circ. No. 27 ...	Fruit: Standards of Perfection	1,000
June 2	Booklets	The Co-operative Farmers' Institute of B.C.	2,500
„ 12	Agric. Dept. Circ. No. 29 ...	Hints to Exhibitors at Fall Fairs: Box Fruits, etc.	500
„ 13	Report	Agricultural Fairs Associations, 1918	500
„ 14	Bulletin No. 83	Preservation of Food, etc.	20,000
July 22	Bulletin No. 30 (4th Ed.) ..	Guide to Bee-keeping	4,000
Aug. 1	Farmers' Institute Report ..	Agricultural Conference held at Smithers	500
„ 7	Bulletin No. 1	Handbook of B.C. for Toronto Exhibition	3,000
„ 8	Circ. Bull. No. 4 (2nd Ed.)	Management of Turkeys	1,500
„ 12	Handbook of B.C.	1919 Edition	2,000
„ 13	Hort. Circ. No. 53	Selection of Orchard Sites, etc.	2,500
„ 13	Circ. Bulletin No. 24	Poultry-culling Demonstrations and Appliances ...	2,000
Sept. 5	Leaflets	*Re* Fire-blight	1,000
„ 8	Hort. Circ. No. 31 (2nd Ed.)	Peach-twig Borer	2,500
„ 8	Hort. Circ. No. 36 (2nd Ed.)	Onion-thrips	2,500
„ 9	Agric. Dept. Circ. No. 30 ..	Milk, the Protective Food	4,000
„ 26	Circ. No. 30	Milk, the Protective Food	3,000
„ 27	Circ. Bull. No. 19 (2nd Ed.)	Poultry Rations, etc	5,000
Oct. 1	Bulletin No. 39 (3rd Ed.) ..	Natural and Artificial Brooding and Incubating ..	5,000
„ 14	Circ. Bull. No. 11 (3rd Ed.)	Poultry-keeping on a City Lot	7,500
„ 20	Bulletin No. 26 (6th Ed.) ..	Practical Poultry-raising	10,000
Nov. 24	Circ. No. 14	Community Breeding	500
Dec. 12	Bulletin No. 71 (2nd Ed.) ..	Butter-making on the Farm	5,000
„ 15	Hort. Circ. No. 54	Loganberry Culture	10,000
„ 24	Hort. Circ. No. 59	Rose Culture	2,000

Bulletins and Circulars dispatched during the Year.—The grand total of all publications sent out from the Department through the mails or personally delivered to callers was 144,605, as against 50,000 in 1918. This big increase was partly due to the number of publications distributed at the Toronto National Exhibition, and also at the Provincial Exhibition, which was again held at New Westminster.

FINANCIAL.

The appropriations for this Department for the fiscal year ending March 31st, 1920, amounted to $271,334. It was found necessary, however, to supplement certain votes at the close of the year by special warrants, as follows:—

Inspection and Fumigation of Imported Fruit and Nursery Stock	$ 3,500
Agricultural Fairs, etc.	3,000
Women's Institutes, etc.	3,500
Departmental exhibits	1,500
Total	$11,500

To do this must be added the sum of $7,786, being the total additional moneys required in connection with the payments of bonuses and increases of salaries to officials based upon the

regrading under the "Civil Service Act," making the grand total of appropriations for the Department $290,620, as against $243,320.10 for the previous fiscal year, or a total increase of 16.2 per cent.

The gross receipts of the Department for the calendar year amounted to the sum of $116,471.97, the strictly revenue receipts being $41,419.85; the latter being a considerable decrease as compared with 1918 owing to the closing-down of the Frondeg Farm. (*See* Appendix No. 2 for comparison of sums voted for the Department.)

"*Agricultural Instruction Act, 1919-20.*"—The following payments were received during the year from Ottawa:—

January 23rd, 1919, balance due from 1917-18	$ 5,250 00
May 14th, 1919, second portion of 1918-19 grant	34,599 53
November 20th, 1919, advance on account 1919-20 agreement	10,000 00
Total	$49,849 53
Credit balances, January 1st, 1919	15,233 39
Miscellaneous refunds during 1919	8,175 88
Overdraft at close of 1919	6,337 21
Total	$79,596 01

The expenditure under the various sections of the "Instruction Act" were as per attached statement:—

Quarter ending March 31st, 1919	$21,091 23
" June 30th, 1919	28,080 62
" September 30th, 1919	15,270 40
" December 31st, 1919	15,153 76
Total	$79,596 01

It will be noted that the total, $79,596.01, exceeds the expenditure during 1918 by $11,046.49. This has resulted in our commencing the year 1920 with an overdraft of $6,337.21. The total number of cheques drawn on the special account at the Canadian Bank of Commerce was 1,272.

Seed-grain Refunds.—The matter of refunds has engaged the attention of the Department throughout the year, and in the fall a letter was addressed to every person whose name was recorded as receiving seed-grain either in 1915, 1917, or 1918. The results with regard to the 1918 distribution have been very satisfactory. This is largely due to a lien upon the property of persons to whom seed was supplied having been registered. Where there is no security, as in 1915 and 1917, the requests from the Department have met with practically no response, and stricter measures will have to be devised if the sums outstanding at the close of the year are not to be bad debts.

The following figures show the total seed-grain refunds during the calendar year:—

Seed-grain distribution, 1915	$ 294 73
" " 1917	281 53
" " 1918	10,755 67
Total	$11,331 93

Amounts on account of seed-grain outstanding at the end of 1919, so far as departmental records show, are as follows:—

Promissory note, not including interest, 1915	$ 5,660 30
" " 1917	2,909 49
" " 1918	10,422 45

BRITISH COLUMBIA STUDENTS.

Reports from the Bursar of the Ontario Agricultural College at Guelph showed that four British Columbia students who had enlisted for overseas service during the war had now returned to complete their courses. There is also a considerable increase noted in the number of young ladies taking the Teachers' Course in Home Economics, there being four entries at O.A.C., four at the University of Toronto, and one at the Manitoba College.

The following were the students to whom grants were paid:—

Ontario Agricultural College, Guelph.—Miss C. E. Maxwell, 702 Fourth Avenue, New Westminster, Home Economics, Second-year Course, Junior Normal; Miss B. S. Dickinson, Duncan,

Home Economics, Second-year Course, Senior Normal; Miss M. Grant, 1100 Sixth Avenue West, Vancouver, Home Economics, Second-year Course, Senior Associate; Miss G. Rebbick, care Mrs. Mahon, 1001 Seaton Street, Vancouver, Home Economics, Second-year Course, Senior Associate; H. R. L. Davis (returned soldier), Langley, Agriculture, Second-year Course; A. Fulton (returned soldier), Lumby, Agriculture, Third-year Course; J. C. Roger (returned soldier), Summerland, Agriculture, Fourth-year Course; E. C. Hessel (returned soldier), Vernon, Agriculture, Fourth-year Course.

University of Toronto.—Miss K. Drew, New Westminster, Home Economics, Second-year Course; Miss M. E. Gilley, New Westminster, Home Economics, Third-year Course; Miss M. E. Graham, Milner, Teachers' Course; Miss B. Beddie, 207 Burris Street, Hamilton, Ont., Teachers' Course.

Manitoba College.—Miss G. Hallwright, 916 Tolmie Avenue, Victoria, Home Economics, final year.

BEE-INSPECTION WORK.

An interesting feature of the past year was the enactment of the "Foul Brood Bees Act Amendment Act," which contains several new points, the chief ones being that no bee-keeper should keep any bees except in a frame hive; that within certain specified districts of the Province orders might be made by the Hon. the Minister of Agriculture prohibiting the movement of bees without inspection and certificate; that equitable compensation might be paid after the destruction of any diseased bees or appurtenances have been ordered by an Inspector; that an annual registration fee of $1.50 for the first six hives up to a maximum fee of $5 should be paid by each bee-keeper; and that specified standard labels should be used for British Columbia honey. The amendments to the Act were very largely due to the representations made by the British Columbia Bee-keepers' Association, and necessitated the appointment of a larger number of Inspectors than in previous years, the following appointments being made:—

W. J. Sheppard, Chief Inspector, Nelson—Kootenays.

F. D. Todd, Inspector, Victoria—Vancouver Island, Gulf Islands, Howe Sound.

L. Harris, Inspector, Vernon—Okanagan.

W. H. Turnbull, Inspector, Sullivan Station—Matsqui, Langley, Surrey, Delta, Richmond, Pitt River to Mission.

A. W. Finlay, Inspector, Huntingdon—Chilliwack, Sumas, Dewdney, Kent, Mission to Agassiz.

A. Keir, Inspector, North Lonsdale—Vancouver, North Vancouver, South Vancouver, Point Grey, Burnaby, Coquitlam.

The expenses of administration during the year amounted to $8,708.96, and compensation paid out up to the close of the year was $115.25. The total receipts from bee-registration fees up to the end of December amounted to $2,146.16, but as these moneys were collected under the authority of a Provincial Act they were credited to Provincial revenue, and some arrangement should be made whereby these fees should be credited to the section of the "Instruction Act" from which the expenditures on account of inspection-work are made.

FARMERS' INSTITUTES.

The year 1919 closed with the net number of Farmers' Institutes at 159. Whilst there were several new incorporations, these were offset by the cancelling of the charters of six of the older institutes where the membership had so dwindled, due to various causes, that the business of the institute could no longer be carried on. The new incorporations were as follows: (1) Dunster Farmers' Institute, March 11th; (2) Princeton District Farmers' Institute, April 3rd; (3) Smithers Farmers' Institute, May 10th; (4) Chase District Farmers' Institute, July 14th; (5) Campbell and Robins Range Farmers' Institute, August 13th; (6) Newlands Farmers' Institute, September 20th.

The institutes closed down are: West Kootenay Farmers' Institute, July 9th; Fern Ridge Farmers' Institute, December 1st; Chilko Farmers' Institute, December 8th; St. Elmo Farmers' Institute, December 18th; Canford Farmers' Institute, December 26th; Trapp Lake Farmers' Institute, December 26th.

There are also a few institutes in outlying sections which have not yet recovered their normal membership, but which may be expected to resume a fresh period of activity during the coming year. The total membership recorded for 1919 was 6,290, as against 6,072 in the previous

year. The increase is small but satisfactory, and shows that the period of stagnation during the later years of the war is now over. The institutes with the largest membership are as follows:—

Creston	239
Cowichan	163
Spallumcheen	146
Delta	138
Islands	132
Shirley and District	130
Victoria	117
Northern Okanagan	94
Nechako	92
Surrey	91
Kelowna	90

Advisory Board.—The arrangement brought to a successful conclusion in 1918, whereby various institutes in the Province were grouped into nine districts, who nominated members to the Board, was continued. The nominations, which were subsequently approved by the Honourable the Minister, were as follows:—

District.	Area.	Member.
A	Vancouver Island, Gulf Islands, and Bella Coola ...	C. E. Whitney Griffiths, Metchosin.
B	Bulkley Valley, Skeena and Nass Valleys	M. F. Nourse, Burns Lake.
C	Prince George, including district from Endako to McBride	J. D. Charleson, Vanderhoof.
D	Kamloops, North Thompson Valley, Nicola Valley, and district between St. Elmo and Revelstoke	Wm. Harrison, Pritchard.
E	Langley and all institutes on south and north sides of Fraser to Chilliwack and Howe Sound	Jas. Bailey, Sardis.
F	Grand Forks, Arrow and Slocan Lakes, and Boundary Districts	A. H. Smith, Nakusp.
G	Kelowna, including Okanagan Valley from Mara to Kaleden, also Salmon River Valley.	L. E. Taylor, Kelowna.
H	Robson, Kootenay Lake, and Kootenay River Institutes	A. D. Clyde, Robson.
I	Cranbrook, South-east Kootenay, and Columbia Valley	A. B. Smith, Cranbrook.

Two important meetings of the Board were held—Victoria, February 19th to 22nd, and Smithers, June 23rd and 24th. The meetings of the Board at Victoria were especially interesting. In addition to the large number of resolutions which were discussed, important statements were made by the Hon. the Minister of Agriculture as affecting the policy of the Department and the agricultural industry, and meetings of a committee of the Board were held with the Agricultural Committee of the Legislative Assembly, who passed their approval upon the final resolutions put through at the Board's meeting.

H. W. M. Rolston, of the Soldier Settlement Board and representative of the G.W.V.A., was appointed a member by the Board to sit with them in all their discussions.

The invitation of A. M. Manson, M.P.P., for the Board to hold their next session in the central portion of the Province was accepted, and arrangements made for the next meeting to be at Smithers.

Smithers Conference.—The Advisory Board, in view of important matters to be discussed, sent out invitations to the Presidents of the following associations: British Columbia Fruitgrowers' Association; British Columbia Poultrymen's Association; British Columbia Dairymen's Association; British Columbia Stock-breeders' Association; Vernon Fruit Union; United Farmers of British Columbia. The Hon. Mr. Barrow, R. R. Walker, of the Land Settlement Board, and the writer also took part in the Conference.

After passing upon a number of resolutions from institutes the main business of the Conference was proceeded with—namely, the framing of resolutions and the taking of preliminary action with regard to: (*a*) The union of Farmers' Institutes and the United Farmers of British Columbia, and (*b*) the organization of an Agricultural Council or Central Executive body to represent the whole body of agriculturists in the Province. These resolutions having been carried

unanimously, committees were appointed to do the preliminary work and ascertain the feelings of the different organizations in the Province and report fully to the next Conference to be held at the capital in 1920, when it is hoped that definite action will be possible along the lines indicated.

Following the meeting at Smithers, the Board and other delegates inspected the Bulkley Valley, Nechako Valley, Burns Lake, and Francois Lake Districts. A large area of agricultural land was carefully looked over and reliable data obtained on possibilities for settlers in the great areas awaiting development. The members of the party returned to their homes impressed with the potentialities of the districts visited, and appreciative of the many courtesies received from transportation companies, Farmers' Institutes, and other bodies, as well as from individual settlers.

Fairs held by Farmers' Institutes.—The following fairs were organized by institutes during the year: McBride, September 5th; Denman Island, September 25th and 26th; Metchosin, October 2nd and 3rd; Rolla (Peace River). Judges were supplied by the Department to the first three points, and the reports indicate that the events were entirely successful.

Stumping-powder.—Early in the year powder companies were able to announce a small reduction to the record price of $10.25 per case which had prevailed at the close of the previous year. By March the price had dropped to $8.67½, by September to $8.42, and at the close of the year stood at $8.14. Strong representations are being made by the Department from time to time to obtain a reduction in powder in view of the paramount importance of this article to the new settlers who are now taking up land, and it is hoped that early in the New Year a reduction of $1 per case will at least be possible owing to the withdrawal of charges for guarding, storing, and handling the departmental stocks which were imposed as war measures. The total number of cases of powder supplied was 7,356, of which the Canadian Explosives Company supplied 4,555 and the Giant Powder Company 2,801.

No itineraries were arranged for short courses or lectures, but a number of individual visits were made by the officials to attend institute meetings by special request, where demonstrations and addresses were given.

The total expenditure of Farmers' Institutes for the calendar year amounted to $9,783.47, being practically the same as in the previous year. The average cost of an institute to the Department worked out at $61.53. (For full details of the cost of administering Farmers' Institutes *see* Appendix No. 3.)

WOMEN'S INSTITUTES.

The year just closed has seen a steady progress made in the Women's Institute movement. Seven new institutes were incorporated, as against two in the preceding year, making the total number now in existence seventy. The new incorporations were as follows:—

Date.	Name.	Headquarters.
May 12	Langley-Triangle	Milner.
June 10	Bonnington and South Slocan	South Slocan.
Oct. 31	Denman Island	Denman Island.
„ 31	South Vancouver	South Vancouver.
Nov. 10	Strawberry Vale	Strawberry Vale (Saanich District).
„ 24	Mount Lehman	Mount Lehman.
Sept. 10	Armstrong	Armstrong.

These new institutes all start off with a membership well over the minimum of twenty-five required for incorporation, and from communications in the Department at the close of the year several more will be organized in the near future. The total membership of Women's Institutes at the close of the year was 2,753, as against 2,428 in the previous year. This is almost identical with the membership for 1917. The ten institutes having the largest membership were as follows:—

Kelowna	139
Cranbrook	128
Cowichan	110
Kaslo	88

Agassiz	74
Summerland	71
Shawnigan Lake and Cobble Hill	64
Central Park	64
Vernon	61
Peachland	60

Conferences were again held at four points: (1) Abbotsford, October 14th to 16th; (2) Nakusp, October 20th to 22nd; (3) Salmon Arm, October 24th and 25th; (4) Victoria, October 28th and 29th.

No Advisory Board meeting was held subsequent to the Victoria Conference, the Board being temporarily suspended owing to irregularities in its constitution. The Institute year was also marked by the lamented death of the Chairman of the Advisory Board, Mrs. A. Blackwood-Wileman, Duncan, V.I., who was seized with a fatal illness on her way home from the Convention of Federated Women's Institutes held at Toronto in November, and succumbed at Calgary. Mrs. V. S. MacLachlan, for some time Secretary to the Advisory Board, was appointed Secretary to Women's Institutes on July 1st, 1919. The total expenditure on Women's Institutes for the calendar year was $11,013.55, as against $4,826.75 in 1918. This very large increase over the cost in 1918 was occasioned by the establishment of the Household Science Branch and also the increased expenditure of the Advisory Board.

Flower-shows.—Thirty-six institutes held flower-shows or exhibitions of women's work during the year, as against thirty-one in the previous year. The Department supplied the usual five book prizes and also assisted by the small grant of 25 cents *per capita*. A number of these institute shows are now established on a sound basis and run in a thoroughly businesslike way; a good prize-list being prepared, and these shows generally coincide with some other local social event. (For full details of the cost of administering Women's Institutes *see* Appendix No. 4.)

Agricultural Fairs.

During the past year two new Fair Associations were incorporated: July 7th, West Vancouver Agricultural and Horticultural Association; July 17th, Bulkley Valley Agricultural and Industrial Association. The total number of existing associations at the close of the year was sixty-nine. The number of exhibitions and fairs held totalled fifty-five, as against forty-one the previous year. This big increase was due to the revival of many of the smaller associations which had been dormant during the war period. No convention of Provincial associations was held during the year, so that arrangements for the various fair dates were made by correspondence; certain dates having been fixed for the important events, such as Vancouver, New Westminster, Duncan, Kamloops, etc., the smaller associations were notified and suitable dates selected.

Five circuits were again arranged for: Circuit 1, Vancouver Island and Gulf Islands; Circuit 2, Lower Fraser Valley; Circuit 3, Okanagan and Kamloops District; Circuit 4, East and West Kootenays and Boundary; Circuit 5, Central British Columbia and Peace River.

Judges.—As in former years, live stock, horticultural, and seed judges were supplied free of all cost to associations who applied for same. Owing to the staff of this Department not being up to full strength the services of a number of experts were requisitioned, as follows:—

Horticultural and Field Crops: M. S. Middleton, Vernon; P. W. Anketell Jones, Chemainus; J. B. Partington, Head Gardener, Parliament Buildings; Professor Barss, University of British Columbia; Professor L. Stevenson, Superintendent, Dominion Experimental Farm, Sidney; P. E. French, Vernon; S. H. Hopkins, Duncan; P. James and A. McMeans.

Live Stock: A. B. Smith, Cranbrook; H. E. Waby, Enderby; J. A. Turner, Victoria; H. Webb, Sardis; Professor H. N. King, University of British Columbia; A. P. McGorman, Kelowna; G. B. Bolster, Nanaimo; Dr. Derby, Vancouver; P. Moore, Colony Farm, Essondale; W. McIntyre, Chilliwack; G. S. Harris, Moresby Island; E. Buss, Victoria; N. Grimmer, Pender Island; S. H. Hopkins, Duncan.

Poultry: H. E. Waby, Enderby; E. A. Orr, Chilliwack; H. D. Reid, Victoria; W. M. Higgs, Sooke; W. Stonehouse, Vancouver; A. B. Smith, Cranbrook; E. B. Cale, Vancouver.

Dairy Products: F. H. A. Norton, Victoria.

Home Economics: Mrs. M. Carter, Victoria; Mrs. A. Blackwood-Wileman, Duncan.

Judges' reports showed that, whilst high quality in horticultural products was in evidence at most points, the number of entries were much less than in past years, a matter to be regretted, but probably due largely to the difficulty of farmers finding time to spare in preparing exhibits during the busy season, and also to some extent to the lack of the smaller associations giving sufficient publicity to their annual event and taking strong and active measures to arouse the interest of the community.

Grants.—The appropriation voted for the fiscal year ending March 31st, 1920, amounted to $35,000, being more than double the vote for the previous year, which was $16,000. This increase was due to provision being necessary for substantial grants to the Vancouver Exhibition and the Provincial Exhibition at New Westminster, which was revived after a lapse of five years. The total sum awarded in grants was $28,135, full details of which appear in Appendix No. 5.

The outstanding feature of the fair year was the splendid exhibitions at Vancouver and New Westminster. The live-stock exhibits at Vancouver were record-breaking, both as to number of entries and quality of stock exhibited, whilst at New Westminster the horticultural and field-crop exhibits, both from individuals and districts, were the outstanding features. The latter association deserves praise for the splendid way in which it has commenced operations again: the amount of work to be done in replanning grounds and rebuilding was of a formidable character and the successful result reflects the greatest credit on all parties concerned.

CO-OPERATIVE ASSOCIATIONS.

The past year has been marked throughout the Province by a co-operative movement affecting various phases of the agricultural industry. This is evidenced by the increased prosperity of the existing associations already incorporated with share capital under the "Agricultural Act," including fruit-growers, live stock, creameries, and miscellaneous co-operative associations, and also by the number of new associations incorporated by the Department, as follows:—

Name.	Date of Incorporation.	Share Capital.
Revelstoke United Farmers' Co-operative Association	March 6th	$ 5,000
Vancouver Island Milk Producers' Association	April 10th	100,000
Nanoose District Co-operative Association	May 8th	25,000
Princeton Co-operative Association	October 6th	20,000
Fraser Valley North Langley Co-operative Association	November 26th	10,000
Fraser Valley Agassiz Co-operative Association	„ 26th	25,000
Fraser Valley Matsqui Co-operative Association	„ 26th	10,000
Fraser Valley Surrey Farmer Co-operative Association	„ 26th	25,000
Fraser Valley Huntingdon Feed and Produce Association	„ 26th	20,000
Fraser Valley Delta Co-operative Association	„ 26th	250,000
Fraser Valley Richmond Producers' Association	„ 26th	15,000
Fraser Valley Farmers' Feed Association	„ 26th	50,000
Total		$555,000

All of which is respectfully submitted.

WM. J. BONAVIA,
Secretary.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, VANCOUVER ISLAND AND LOWER MAINLAND DISTRICTS.

E. W. White, B.S.A.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for Vancouver Island and the Lower Mainland District for the year 1919.

Staff.

The Horticultural Branch has been without the supervision of a Provincial Horticulturist during the entire year of 1919, no one having been appointed to that position since the resignation of M. S. Middleton in November, 1918.

In April, 1919, Ben Hoy, Assistant Horticulturist at Vernon, was placed in charge of all the work in the Interior of the Province, and your assistant was left in charge of the office at Victoria and the work in the Coast sections.

On July 1st, 1919, K. W. Munson, District Field Inspector for the Lower Mainland, severed his connection with the Department to enter commercial work. No successor was appointed, due to the fact that several former members of the staff were expected back from overseas service.

On September 1st, 1919, W. H. Robertson, who was Assistant Horticulturist for Vancouver Island and the Lower Mainland before going overseas in January, 1916, returned to duty. He immediately assisted with the work in the Victoria office and took over the field-work on the Lower Mainland.

Orchard-renovation Work in the Fraser Valley.

This work, which occupied a great deal of time in the spring of 1918 following the very severe ice-storm of the previous winter, was continued in the spring of 1919. Pruning demonstrations were given in a number of orchards which of necessity had to be omitted in 1918. Considerable grafting-work was also done throughout the district.

Small-fruit Plots, Chilliwack.

The same arrangements as were made in 1918 with K. W. Munson were continued in 1919 in reference to the small-fruit plot at Chilliwack, which was under the direction of the Horticultural Branch from 1912 to 1916. This plot consists of 2 acres Evergreen and ½ acre Snyder blackberries, ¾ acre Cuthbert raspberries, and ½ acre loganberries. As in 1918, this plot, despite the high rental of $112.50 per acre which was paid, again was a decided financial success.

Due to the increasing interest being shown in small fruits, Mr. Munson made arrangements with A. H. Ingrams, of Fairfield Island, Chilliwack, to conduct tests with different varieties of strawberries, different methods of growing, and cost of production.

These two plots afforded places where a great deal of valuable information was distributed cheerfully and gratuitously to a great many intending settlers, both returned soldiers and others, and the plots did a great deal to encourage small-fruit planting in the district.

Demonstration Strawberry-plot, Gordon Head.

This plot was established in March, 1919, for two main purposes: First, in order to demonstrate the possibility of building up and improving an impoverished strawberry-soil badly infested with the strawberry-root weevil (*Otiorhynchus ovatus* Linn.) and other strawberry-insects by the adoption of a regular system of crop-rotation, of proper and modern methods of culture, and of the recommended control measures for the said strawberry-root weevil; and, second, for the purpose of making further investigations into the life-history of the said weevil and the testing-out of different types of weevil barriers. The lease is for a period of six years. Supervision of the plot was placed with the Horticultural Branch and the representative of the Dominion Entomological Branch.

Considerable time was spent in selecting a suitable piece of land, and the plot was finally located on the farm of G. A. Vantreight, Gordon Head. It consists of approximately 6⅓ acres and is oblong in shape, measuring 810 feet long and 342 feet wide.

In selecting the plot it was endeavoured to secure the worst weevil-infested patch in the district, and it may be said that in the spring of 1918 approximately 4 acres out of the 6 were in strawberries which were to bear the second crop. By May it was seen that approximately 1 acre was so badly infested with weevil that it would be useless to leave it, so that it was ploughed up and planted to potatoes. From the 3 acres which were left only about 75-100 crates of strawberries were harvested. The other 2 acres making up the 6 were in clover-sod.

The plot was divided into six lots of approximately 1⅙ acres, measuring 342 feet long and 135 feet wide. A six-year rotation about as follows was decided upon: 1919, plant to strawberries; 1920, first crop; 1921, second crop, remove plants in September, prepare land and seed to fall wheat and clover; 1922, harvest crop of fall wheat; 1923, harvest crop of clover, in fall manure and plough; 1924, plant potatoes; and in 1925 the land should be in shape to plant back to strawberries. This means that on a 6-acre unit there would never be more than 2 acres in bearing strawberries—1 acre first crop and 1 acre second crop—1 acre would be in young plants, 1 acre in wheat, 1 acre in clover, and 1 acre in potatoes.

In taking over the plot in March, 1919, we found the land in the following condition: Approximately 1 acre, Lot 1, was in clover; 1 acre, Lot 2, had been ploughed in the fall of 1918 and was ready for potatoes; 2 acres, Lots 3 and 4, were in fall wheat; and 2 acres, Lots 5 and 6, were in fall oats.

In order to start operations it was decided to plant 1 acre in the spring of 1919. Lot 4 was selected as the most suitable lot on which to plant. This was the piece of land on which the strawberries were a failure in the spring of 1918 and which had been ploughed up in May and planted to potatoes. In the fall it was seeded to fall wheat. In the spring we manured on the fall wheat with approximately 32 tons of cow manure; the land was ploughed and prepared for strawberries and planted on April 29th and 30th. A weevil barrier made of boards 1 inch thick and 12 inches wide was built around the entire acre. The top 2 inches of the board was covered with tree tanglefoot.

Lot 1 was left in clover-hay; Lot 2 was manured with approximately 32 tons of cow manure and planted to potatoes on June 19th, which was too late, but circumstances prevented earlier planting; Lot 3, in fall wheat, was seeded to red and alsike clover; Lots 5 and 6 were in fall oats and the crop was harvested.

It is too early to predict what success or failure may attend the plot, but this preliminary and general report is made in order to give an idea of the work which is being attempted. A complete and detailed report will be published at the conclusion of the six-year lease and interim reports will be published from time to time.

EXPERIMENTAL SPRAYING.

Tanner Bros.' Orchard, Keating.—The work which was conducted in this orchard in 1916, 1917, and 1918 for the control of anthracnose on a block of thirty-six trees, consisting of three plots of nine trees each and a check-plot of nine trees, was really completed on May 29th, 1919, when J. W. Eastham, Provincial Plant Pathologist, made the final counts for new infection.

As reported in previous reports, these trees were twenty years old when taken over in 1916 and were so badly diseased with anthracnose that there was practically no new wood in them and nothing remained but the main trunk and branches.

The final inspection for new infection in May, 1919, gave the following result:—

Plot 1, which had just received an early spray the first week in September, while the fruit was on the tree, of 3-4-40 Bordeaux, only showed thirteen new infections; three trees were absolutely free of the disease, three trees showed one infection each, two trees showed three infections each, and one tree showed four infections.

Plot 2, which received the early weak spray at the same time as Plot 1, and also a 6-6-40 Bordeaux spray about the end of October after the fruit was harvested, only showed six new infections; five trees were absolutely clean, two trees showed one infection each, and two trees showed two infections each.

Plot 3, which received only the late spray of 6-6-40 Bordeaux at the same time as Plot 2, showed 130 infections; the lowest number of infections were seven on one tree and the highest were twenty-nine on another tree.

Plot 4, in which the trees were unsprayed, showed anywhere from 50 to 100 new infections per tree.

The results show that even a weak Bordeaux, applied early, will control the disease almost entirely. The cost of the early spray over three years only averaged 14.19 cents per tree.

In reference to the production of fruit, it might be said that the variety, being Baldwin, had formed a biennial system of bearing; the years 1914, 1916, and 1918, being the off-years, will not be taken into consideration. In 1915, however, the crop averaged about a box and a half per tree; in 1917, after two years of spraying, it averaged five boxes per tree; and in 1919, after four years of spraying, the crop averaged nine boxes per tree, and this from trees which in 1916 were considered total wrecks and almost valueless. A detailed summary of the work appeared in the September issue of the *Agricultural Journal*.

Stewart Bros.' Orchard, Keating.—In the fall of 1919 a block of 1 acre of fifteen-year-old Kings consisting of forty-five trees was taken over in order to conduct further tests in the control of anthracnose and to test out different sprays. The block was divided into five plots: No. 1 was sprayed in September, while the fruit was on the tree, with 3-4-40 Bordeaux; No. 2 was sprayed at the same time with Burgundy mixture, practically a colourless mixture made from the following formula: 1 lb. copper sulphate or bluestone, 1½ lb. sal soda, and 40 gallons water. If this proves efficient it will be very beneficial, because it may be applied at any time and leaves no deposit on the fruit. No. 3 was sprayed in October, after the fruit was picked, with 3-4-40 Bordeaux; No. 4 was sprayed at the same time with 6-6-40 Bordeaux; and No. 5 was sprayed at the same time with lime-sulphur 1-9. A check-tree was left in each plot. It was intended to test out the prepared Bordeaux paste, but none could be secured at the time. This test will be made in 1920.

Horticultural Conditions.

The Department made no grants towards these competitions in 1919, but your assistant was called upon to judge two garden competitions which were the outgrowth of the competitions formerly encouraged by the Department.

Ward IV. Saanich cottage-garden competition, having eleven entries, was judged on August 4th and August 29th; Ward VII. Saanich cottage-garden competition, having twenty-four entries, was judged on July 7th and August 28th.

Fall Fairs.

The following fall fairs were attended in the capacity of judge of fruit and vegetables: Kamloops, assisted by C. R. Barlow; Armstrong, assisted by H. H. Evans and P. E. French; Creston, assisted by Ben Hoy; and the last fair judged was at New Denver. The Provincial Exhibition at New Westminster was visited on the last day. The garden vegetables at the North and South Saanich Fair were also judged. A detailed report has been submitted.

In addition, your assistant judged at the annual flower-show of the Hatzic Women's Institute on June 12th, at the annual show of the Ward II. Saanich Cottage Garden Association on August 30th, and at the annual show of the Ward IV. Saanich Cottage Garden Association on September 10th.

Inspection of Nurseries.

This work was carried out according to the regulations in so far as it was possible. Inspections were made in the spring at shipping-time, during the summer, and again in the fall at digging-time.

Nurserymen were practically sold out of all available stocks in the spring of 1919, and at the present time are faced with a severe shortage and are unable to meet the demands of the 1920 shipping season. This condition exists in practically all parts of Canada and the United States; prices for stock are consequently very high.

Insect Pests and Diseases.

Systematic orchard-inspection work has been almost impossible, due to the shortage of help, but a great many inspections were made on specific requests.

Pear-thrips.—No experimental work was conducted on this pest during the season. It was still serious in some orchards, but where the trees were thoroughly sprayed with the recommended sprays serious damage did not result. So far this pest is confined to Vancouver Island and the Gulf Islands and has not yet been reported from the Lower Mainland.

Strawberry-root Weevil.—This insect again caused severe damage in some plantations, but growers are beginning to adopt the recommended methods of control, with good results. As noted above, extensive studies with this pest have been started on the demonstration strawberry-plot at Gordon Head, the life-history work all being done by W. Downes, of the Dominion Entomological Branch.

Crown-borer.—This pest is beginning to cause considerable trouble in loganberry and raspberry plantations, but it is not thought that it will ever become very serious.

Codling-moth.—This insect has been known to exist in the Victoria District since 1909. Extensive work was carried on up to 1915. When the pear-thrip struck the district, codling-moth work was of necessity dropped, and consequently no systematic work was carried on during 1916, 1917, 1918, and 1919. However, during the past season the pest has again been reported a number of times, and it will be necessary to undertake work along this line in 1920.

In September a codling-moth infestation was also reported from North Bend. This was investigated and the report confirmed. Work will need to be undertaken in this district also.

Another slight infestation of codling-moth was reported from New Westminster. This was investigated by W. H. Lyne and confirmed. Some form of control measure will need to be installed.

Tent-caterpillars.—This pest was again very prevalent in Victoria and Vancouver Cities and adjacent municipalities. However, it was principally troublesome in waste places. In well-sprayed and well-cared-for orchards the tent-caterpillar did insignificant damage, and this will always be the case. It is a pest of neglected and waste places.

Anthracnose.—This disease was again very destructive in some orchards. Experimental spraying has proved that it can be almost absolutely controlled, and it is now up to the orchardists themselves.

Apple and Pear Scab.—This disease on both fruits was troublesome in some orchards, but did not cause serious financial loss.

Other pests and diseases were of about normal severity and did not cause undue damage where proper remedial measures were adopted.

FRUIT AND VEGETABLE PRODUCTION.

The strawberry-growers of the southern end of Vancouver Island had a very successful season. Climatic conditions were very favourable and the picking season lasted from June 4th to July 22nd. Fifteen car-loads, totalling 11,500 crates, were shipped to Prairie points, and approximately 3,350 crates were marketed in Victoria. In addition to the crate shipments, approximately 400 tons of jam-berries were sent to the jam-factories. The strawberry-crop brought in about $185,000 of new money into the district in 1919.

Tree-fruits were a good average crop, and Olivet cherries especially brought good returns. Vegetable-crops were up to normal, but the very severe weather early in December destroyed a large quantity of semi-hardy vegetables which usually will remain in the ground all winter.

On the Lower Mainland the small-fruit growers had a successful season and the industry is increasing in importance very rapidly. The total value of small-fruit production on the Lower Mainland alone in 1919 almost equalled the total value for the whole Province in 1918.

The plantings in loganberries are increasing every year and there appears to be a bright future for this berry in the Coast districts. Tree-fruits were an average crop, but showed considerable increase over 1918.

Vegetable production is on the increase, but there is room for considerable development along this line, especially among the white growers.

SOLDIER SETTLEMENT.

Due to the activities of the Soldier Settlement Board and allied bodies, a large number of returned men have been settled on farms on Vancouver Island and the Lower Mainland. The majority of these are on small acreage. A number are more or less inexperienced and they have naturally come to the Department of Agriculture for advice, despite the fact that the Soldier Settlement Board has a large number of field supervisors at work. Help has always been given whenever possible, but the demand has been so constant that time was the limiting factor as to the amount of assistance which could be rendered.

Demonstrations and General Work.

Demonstrations in various branches of horticultural work and personal calls to growers take up a great deal of time during the year. This work has been especially heavy this year, due to the fact that, besides the soldier settlers, there have been a large number of settlers from the Prairie Provinces and the Old Country.

There is not much to show for this work at the end of each year, but it is extremely valuable and cannot be omitted. It is always appreciated.

Visit to Washington, Idaho, and Oregon.

During the first two weeks of August your assistant was privileged to attend the second annual meeting of the Western Horticulturists, held jointly at the Washington State College, Pullman, and the University of Idaho, Moscow. Representatives were present from the States of Washington, Idaho, Oregon, Montana, Utah, and the Province of British Columbia. Very excellent meetings were held and an excellent field-day was spent at the orchard tract of Lewiston, Idaho. This meeting will be held in Vernon, B.C., in August, 1920. The trip was made by auto and en route the orchard district adjacent to Spokane was visited. On the return journey the fruit districts of Walla Walla, Kennewick, Yakima, Hood River, and Puyallup were visited and very valuable information obtained relative to the industry.

Meetings, Press Articles, and Department Publications.

During the year several meetings were addressed on different subjects; two of the more important being one on "Small Fruits" before the annual meeting of the British Columbia Fruit-growers' Association at Penticton in January, and the other on "Winter Injury to Fruit-trees West of the Cascades" before the annual meeting of the Western Washington Horticultural Association at Everett in February.

Various articles were prepared during the year for the Department's *Agricultural Journal* and for the agricultural press in general.

Two new circulars were written during the latter part of the year for the New Horticultural Series—No. 54, "Loganberry Culture," and No. 55, "Raspberry Culture." However, these will not be received from the King's Printer until after the New Year. Other circulars on strawberries, blackberries, currants, and gooseberries are in the course of preparation.

Correspondence and Office-work.

This work has taken up an increasing amount of time, and despite the fact that the work in the Upper Country has not been directed from this office as in former years, the amount of correspondence is well up to the average. There have been a great many inquiries from prospective settlers as well as new and old settlers.

A great many visitors have also called at the office seeking information, and all the assistance possible has been given. This again is another line of work for which there is not much to show at the end of the year.

All of which is respectfully submitted.

E. W. White,
Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, LOWER MAINLAND DISTRICT.

W. H. ROBERTSON.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith beg to submit my report as Assistant Horticulturist and Inspector of Fruit Pests from September 1st to December 31st, 1919.

FALL FAIRS.

Fall fairs were held this year at various points on the Lower Mainland. Those at which I acted as judge in either the fruit or vegetable sections are as follows: Vancouver, September 8th to 13th; Port Coquitlam, September 17th; Maple Ridge, September 24th; Aldergrove, September 26th; Delta, September 26th; Ganges Harbour, October 1st.

A full report on each of the above fairs, with marked prize-list and recommendations for improvement, has been submitted.

AGRICULTURAL STATISTICS.

Considerable time was devoted to gathering figures relating to fruit and vegetable production. Work along this line was undertaken on the Lower Mainland; the field-work being followed by work in the office compiling data collected.

OFFICE AND FIELD WORK.

Due to the fact that there have been and still are a large number of settlers going into fruit-growing, there is continuous demand for information on fruit-growing subjects. This has entailed a heavy correspondence; personal letters to the grower being supplemented with circulars and bulletins from the Department. Wherever possible, personal visits have been made to various growers and instruction given in pruning and other phases of orchard work.

All of which is respectfully submitted.

W. H. ROBERTSON,
Assistant Horticulturist.

REPORT OF DISTRICT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, OKANAGAN VALLEY.

B. HOY, B.S.A.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—Below is a report of the work done by the Horticultural Branch of the Department of Agriculture during the year 1919 in the Interior of British Columbia.

LECTURES AND FALL FAIRS.

During the year members of the Horticultural Branch attended and lectured at many farmers' and fruit-growers' meetings, assisted in judging at the fall fairs, and in judging field-crop and garden competitions. Reports covering this work have from time to time been submitted to the Department.

The writer judged the fruit and vegetables at Nelson, Oyama, and Summerland, and assisted in the judging at Creston, Kelowna, and Penticton. Lectures on horticultural topics were given at the British Columbia Fruit-growers' Convention at Penticton, Vernon Farmers' Institute, Salmon Arm Farmers' Institute, Naramata Farmers' Institute, and at Rutland.

PACKING AND PRUNING SCHOOLS.

No packing or pruning schools were held during last year. Owing to the expense of conducting packing-schools and such a very small percentage of pupils ever taking up packing in the organized fruit districts, packing-schools do not accomplish the desired results. However, in unorganized districts, where there is no other means of people learning how to pack, packing-schools are useful.

Announcements and application forms for pruning classes this winter have been sent out, and as an indication of the demand for instruction in this branch of orcharding the following applications have been received to date: From Vernon for three schools with full number of pupils, from Kelowna for two schools, and one school at each of the following places: Ewing's Landing, Woods Lake, Naramata, Grand Forks, Cawston, Kaleden, and Willow Point. It is expected that during the next two weeks several more applications will be received at this office.

FIRE-BLIGHT.

A very great deal of your Inspector's time is taken up in the control of this disease. This year shows considerable improvement over last year in the amount of blight-infection. Kelowna and a small section of orchard on the Vernon Road near Duck Lake suffered more than any other district this year. At Kelowna three special Inspectors were employed for a month this spring to make a thorough inspection and urge the cleaning-up of blight in every possible way. This work resulted in many infected trees being cut out and, for the time at their disposal, a good general clean-up. Though Kelowna had considerable blight last summer, there was not more than 30 per cent. as much as in the summer of 1918. During the summer newspaper articles have been written and circulars distributed concerning the control of blight, and your Inspectors have continually kept in touch with owners of blight-infected orchards. Much summer and fall cutting of blight has been done and many growers are busy at the present time cutting out blight and pruning. From present indications there is every reason to believe that orchards will be freer from blight when growth starts next spring than they have been for several years.

Your Inspectors have all been instructed to enforce the new regulation in Horticultural Regulations. This has also been given wide publicity.

CODLING-MOTH.

Detailed reports on the control of the codling-moth in Vernon, Walhachin, and Westbank are attached to this report. At Westbank the work was done the same as in previous years and no worms were found in the district. Although this district may be assumed to be free from this pest, in order to be safe the spraying and inspection of bands should be undertaken by the Department of Agriculture for another season.

At Vernon considerable headway was made in the control of codling-moth, but there is yet a great deal of work to be done before the pest is eradicated.

In 1918 394 specimens were captured, and from the same area in 1919 195, showing a decrease of 50 per cent. However, in 1919 a new infected area was discovered, and from this area 178 specimens were taken, bringing the total captured in 1919 to 372. All the adjacent orchards to those infected are now held under quarantine; this, combined with the strict inspection put into force and with careful work on the part of the Inspectors, should aid materially in preventing any further spread. Most thorough and painstaking work is required on the part of the Inspectors, especially in scattered orchards just out of the main infected area, because it is only by preventing further spread and thoroughly cleaning up the outside scattered areas and gradually reducing the size of the area under quarantine that we can hope for eradication. This also requires the most earnest co-operation of growers close to the quarantined areas.

Three hundred and seventy-eight foreign cars were inspected at Okanagan Landing and eighty-eight at Similkameen. This is a very important phase of codling-moth control in this Province. At Okanagan Landing a total of 203 specimens were taken from these cars. In car 53101, Illinois Central, twenty larvæ were captured on November 19th. A recommendation has been sent to the British Columbia Fruit-growers' Association pointing out the dangers from this source, and requesting them to take some action regarding a system of disinfection at divisional points.

The Walhachin codling-moth area we may now regard as free from this pest. Spraying and band inspection was again carried out last summer, with the result that no worms were found.

EXPERIMENTAL WORK.

Apple-scab.—Experiments were conducted in the control of apple-scab at Vernon, Salmon Arm, and in the Kootenay. Separate detailed reports of these experiments by Messrs. Hunt, Evans, and Barlow are attached to this report. These experiments should all be continued next year.

Aphis Experiments.—At Vernon tests were made in the control of green aphis. In this test we found Black Leaf 40, 1 part to 2,000 gallons of water, with 2 lb. of freshly slaked lime added to each 100 gallons of mixture, killed the green aphis satisfactorily. When spraying for aphis alone the cost of this mixture is less than half of the ordinary mixture used in the control of aphis, which is Black Leaf 40, 1 to 1,000, with 3 to 5 lb. of soap in every 100 gallons.

Cover-cropping.—A small amount of hairy vetch and sweet clover seed was placed with growers in the Kootenay, Okanagan Centre, and Salmon Arm to demonstrate the value of cover-cropping in these districts.

Lime Tests.—At Salmon Arm tests are being made with lime on acid soils. Several tests are being made, including all the soil types in the district. This season was very dry and the results obtained are neither satisfactory nor conclusive. Mr. Barlow's report outlines this work in detail.

Pruning.—Experiments to demonstrate the results of various degrees of cutting have been started at Vernon by H. H. Evans. This is valuable work if carried to completion, and every encouragement should be given Mr. Evans to continue and complete this work.

Peach and Apricot Inspection.—As in previous years, peaches and apricots were inspected at shipping-points by your Inspectors for the peach-worm. Spraying for this pest again demonstrated the value of lime-sulphur spray at the time the blossoms are opening. This single spray put on as late as possible, before the blossoms are open, will give good commercial control of the peach-twig borer.

STATISTICAL WORK.

Crop estimates and figures on tonnage of fruit and vegetables shipped out and handled by the canneries, evaporators, etc., are gathered by members of this Branch and sent in to the Statistician for compilation.

GENERAL WORK OF BRANCH.

The same general policy as followed in previous years was carried out this year; your Inspectors have at all times been at the service of the growers. Owing to many new soldier settlers and Prairie men a great deal of your Inspector's time has been taken up in consulting and advising new-comers. The demand in this line of work has been greater than ever before. It is valuable work, but takes considerable time that would otherwise be spent in inspection and demonstration work among the established settlers.

Respectfully submitted.

BEN HOY,
District Horticulturist.

REPORT OF DISTRICT FIELD INSPECTOR, SOUTHERN OKANAGAN, SIMILKAMEEN, AND BOUNDARY DISTRICTS.

W. T. HUNTER.

Dr. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith respectfully beg to submit my annual report as District Inspector for Penticton, Naramata, Grand Forks, Keremeos, comprising the Southern Okanagan, and Similkameen and Boundary Districts.

INSPECTION-WORK.

The work along this line was slightly interfered with by duties in connection with the seed-work on behalf of the United Seed Growers, Limited, but close observation was maintained at all seasons in connection with the following pests, and every endeavour was made by your official to assist in their control wherever found:—

Fire-blight.—This disease remained very quiescent throughout the whole of the district under my jurisdiction this season. Slight outbreaks occurred in a very limited section at Penticton and at Grand Forks. It was found, however, that growers were paying strict attention to the

cutting-out of al infections where found, with the possible exception of a few growers at Grand Forks, and I would urge the advisability of the Department placing an official in the Grand Forks District permanently in order that a close and more effective inspection of the work can be carried out in that important district.

Peach-worm.—Measures recommended by the Department, acting on the advice of R. C. Treherne, Dominion Entomologist for British Columbia, for the control of this pest proved very satisfactory this year wherever carried out, and it was found in all cases where the semi-dormant or pink spray was carefully applied that almost complete control was obtained with this one application, and we have no hesitation in saying that for commercial purposes this spray is the most effective spray to use. Close inspection of peach and apricot shipments was made throughout the shipping season for the detection of this pest, and the hearty co-operation of the shipping concerns throughout the district was obtained in this work.

Powdery Mildew of the Apple.—This disease is becoming very prevalent throughout the southern district, particularly Penticton and Naramata sections, the growers finding great difficulty in controlling same with a reasonable amount of expenditure for spraying operations. I would like to recommend that a series of experiments be undertaken in connection with this disease to determine the most reliable and at the same time the most economical method of controlling it.

Blister-mite.—Very little trouble was experienced with this pest on pears the past season, but rather serious outbreaks occurred in the Keremeos section on apples, and the experience of the growers seems to be that more difficulty occurs in controlling blister-mite on apples than on pears. Spraying with dormant strength lime-sulphur must be done very early in the season, and at high pressure, in order to effect control.

Minor Pests and Diseases.—Slight infestations of aphides occurred throughout the section, but were very local in extent. Some oyster-shell scale appeared at Grand Forks. On the whole, we can say that this section was remarkably free from serious diseases and insect pests this year.

DEMONSTRATION-WORK.

Cover-crops.—An attempt was again made to conduct demonstration plots to illustrate the value of nitrogenous annual cover-crops, but considerable difficulty was encountered, due to the fact that a shortage of irrigation-water occurred at the time the cover-crop should have been sown, and the results of this work were negligible. Demonstrations in pruning were given throughout the district and also advice on top-working both by budding and grafting.

SEED-WORK.

The time of your official was very greatly taken up this past year with the organization and business of the United Seed Growers, Limited, and it easily took the greater portion of the time. The company was organized in June, 1919; incorporated in September, 1919; and both before and after incorporation our fullest assistance was given to this work, and the volume of business which was built up and the amount of seed which was handled co-operatively for the growers in our opinion fully justified the amount of time devoted to this work.

JUDGING.

Fall fairs were judged at Nanaimo, Alberni, Denman Island, and Courtenay. A separate report of which was forwarded to you some time ago.

GENERAL CONDITIONS.

The fruit-crop throughout the section exceeded the crop of last year quite considerably and was of very high quality. The District of Naramata suffered in mid-season from a shortage of water, but otherwise the growers have few complaints.

OFFICE-WORK.

Owing to the volume of correspondence throughout the year, particularly in connection with the seed-work, additional help had to be secured, the cost of which was partially borne by the United Seed Growers, Limited. The Department's office, located as it is on the main street of Penticton, has become the centre for the agricultural activities of the district, and its popularity

is attested by the fact that your official received three times as many requests for advice and assistance the past season as in the season before.

All of which is respectfully submitted.

W. T. HUNTER,
District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, VERNON.

H. H. EVANS.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I herewith beg to submit my annual report as District Field Inspector for the Okanagan Centre, Oyama, Vernon, Armstrong, and Enderby Districts for the year 1919.

FARM-GARDEN COMPETITION.

A farm-garden competition was held under the auspices of the Northern Okanagan Farmers' Institute; there were five entries, the judging being performed by Ben Hoy, District Horticulturist, and your Inspector.

JUVENILE GARDEN COMPETITION.

This competition was held under the auspices of the Kalamalka Women's Institute, and to the writer's knowledge is the only one of its kind held in the Okanagan. The judging was performed by your Inspector. Separate reports and scores of the above have been previously submitted.

EXHIBITION-WORK.

Your Inspector acted as judge at the Armstrong and Naramata Fall Fairs, reports of same having been submitted. Judging at the Northern Okanagan Women's Institute Fair and the Oyama Juvenile Fair was performed by your Inspector and Ben Hoy, District Horticulturist.

PEST-INSPECTION WORK.

Inspection of Export Fruit and Vegetables.—Only one car of export apples for Australia was inspected at Vernon in 1919.

Nursery Inspection.—Smith & Gorham's nursery at Hullcar was given two inspections by your Inspector during the spring shipping season, and considerable stock condemned through being infected with *Armillaria mellea* (mushroom root-rot). Separate reports of the above have been submitted.

Inspection of Foreign Cars.—A report of this work is incorporated in the detailed report of codling-moth control work attached hereto.

FIELD-WORK.

Codling-moth Control.—A separate report of this is attached.

Powdery Mildew.—This fungous disease has obtained a firm grip in the Oyama and Okanagan Centre sections. The orchardists in these sections have now become fully alive to the serious menace of this disease to the apply industry, and in consequence there is more promise of systematic spraying being performed by the growers in the coming year to combat this disease. During the spring of 1919 two growers at Oyama, on the advice of your Inspector, carried out systematic spraying for the control of this disease, and the results of same were gratifying.

Oyster-shell Scale.—Though very prevalent in some of the older orchards, where it undoubtedly causes serious loss to the individual, this pest is not a serious menace where proper spraying methods are practised, and it becomes a problem of the individual orchardist entirely as to the degree of cleanliness of his orchard.

Aphides.—Green apple-aphis has not been a serious orchard pest during 1919, but woolly aphis was very generally distributed; where proper methods of control have been used this pest has not been serious.

Fire-blight.—Throughout the whole of your Inspector's district fire-blight is more or less scattered. The most serious infection during 1919 has been in the Okanagan Centre and Duck Lake sections.

Owing to the steady demand on your Inspector's time throughout the summer by the codling-moth work thorough supervision of blight-control has been unavoidably lacking; a strong effort will be made, however, for a general clean-up before spring. It can be definitely asserted that over the whole district there is greater freedom from this disease now than in the two previous years.

EXPERIMENTAL WORK.

Control of Apple-scab and Apple-aphides.—Separate reports on the experimental work on the above are attached.

Pruning Experiment.—Owing to the lack of uniformity of system and methods practised by the general run of pruners in the Okanagan it was decided to institute a series of pruning experiments over a period of years, whereby data could be gathered to determine the most satisfactory method of pruning the apple in the Okanagan from the age of two years to maturity, or thirteen to fourteen years of age; the results of which could be published in bulletin form for the benefit of our orchardists.

For this experiment two blocks of orchard have been loaned to the Department, one block of eight-year-old bearing trees by the Coldstream Estate Company, and one block of two-year-old trees by A. T. Howe, both situated in the Vernon District.

Ben Hoy, District Horticulturist, assisted your Inspector to draw up the plans of operation as regards styles of pruning to be adopted and system of records to be kept. The experiment covers a five-year period, and taking ages of the two series, the results will provide data covering tree development and yields over a ten-year period of growth. It is expected that, if this experiment can be conducted to the end of the period set, records will be obtained of inestimable value to the orchardists of the Okanagan.

GENERAL.

Special calls and visits for growers and institutions throughout the district have increased tremendously with the advent of soldier settlement, and with the general routine office-work combine to absorb considerable time throughout the year.

Your Inspector hereby wishes to acknowledge the assistance accorded him by R. C. Treherne and M. H. Ruhmann, of the Entomological Branch, in the breeding and identification of specimens taken in the field.

All of which is respectfully submitted.

H. H. EVANS,
District Field Inspector.

I.—REPORT ON EXPERIMENTS FOR THE CONTROL OF APPLE-SCAB.

H. H. EVANS.

Experiments were conducted on the W. S. Johnston orchard. Variety, McIntosh Red. Trees, fifteen years old. Same plots as in previous years. The experiments comprise two series. Series A is an efficiency test of three commercial compounds of sulphur—namely, liquid lime-sulphur, soluble sulphur, and dry lime-sulphur. This experiment is in its first year. Series B is for testing of liquid lime-sulphur at varying strengths; the work of 1919 completes the three-year period of Series B. Table 5 gives the three-year average results of Series B.

Definition of Abbreviations.—L.S.=Liquid lime-sulphur. S.S.=Soluble sulphur. D.L.S.=Dry lime-sulphur. Hd.L.=Hydrated lime.

Following are the tables of application and results:—

SERIES A, TABLE 1.—MATERIALS TEST.

Spray Period.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot. 6.	Plot 7.
Pink	S.S. 1 lb. to 40 gals.; Hd. L. 5 lb.	.....	D.L.S. 3 lb. to 40 gals.	.....	.....	L.S. 1-60..	Check.
Calyx	S.S. 1 lb. to 40 gals.; Hd. L. 5. lb.	S.S. 1 lb. to 40 gals.; Hd. L. 5 lb.	D.L.S. 2 lb. to 40 gals.	D.L.S. 2 lb. to 40 gals.	L.S. 1-50..	L.S. 1-60 .	"
10 to 14 days later..	.....	.....	.....	.....	.....	.....	"
10 to 14 days later..	S.S 1. lb. to 40 gals.; Hd. L. 5 lb.	S.S. 1 lb. to 40 gals.; Hd. L. 5 lb.	D.L.S. 2 lb. to 40 gals.	D.L.S. 2 lb. to 40 gals.	L.S. 1-50..	LS. 1-60..	"

SERIES A, TABLE 2.—RESULTS OF MATERIAL TESTS AS PER TABLE 1.

Plot.	No. of Apples counted.	Free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	2,953	99.2	0.5	0.3	99.7
2	3,237	98.33	1.24	0.43	99.57
3	4,718	99.57	0.33	0.10	99.90
4	3,396	98.37	1.48	0.15	99.85
5	2,985	95.55	3.45	1.00	99.00
6	3,535	98.98	0.71	0.31	99.69
7 (check)	2,846	82.75	15.81	1.44	98.56

In comparing the total marketable percentages of the above table the differences are apparently small; but in studying the two columns, culls on account of scab and scabbed but marketable, the differences are more noticeable, and would count considerably from the commercial standpoint, by lowering the percentage of No. 1 grade and consequent loss in returns.

SERIES B, TABLE 3.—EXPERIMENTS TESTING DIFFERENT STRENGTHS OF LIME-SULPHUR.

Following are the tables of application and results for the season 1919:—

Table of Application.

Spray Period.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Check.
Pink	.....	L.S. 1-35	L.S. 1-40	L.S. 1-40	.....
Calyx	L.S. 1-35	L.S. 1.40	L.S. 1-45	L.S. 1-50	.....
10 to 14 days later	L.S. 1-35	L.S. 1-40	L.S. 1-45	L.S. 1-50	.....

SERIES B, TABLE 4.—RESULTS OF APPLICATION, TABLE 3.

Plot.	No. of Apples counted.	Free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	4,230	98.94	0.78	0.28	99.72
2	3,296	100.00	....	...	100.00
3	2,699	100.00	....	...	100.00
4	3,822	100.00	....	...	100.00
5 (check)	2,846	82.75	15.81	1.44	98.56

The above completes the three-year experiment on these plots.

SERIES B, TABLE 5.

Below is given the three-year averages of the above plots in years 1917-18-19:—

Plot.	No. of Apples counted.	Free from Scab.	Scabbed but Marketable.	Culls on Account of Scab.	Total Marketable.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	2,133	99.31	0.48	0.21	99.79
2	2,253	98.85	1.09	0.06	99.94
3	1,801	99.70	0.25	0.05	99.95
4	2,405	99.65	0.18	0.17	99.83
5 (check)	2,093	74.48	22.95	2.57	97.43

Average yield per plot free over the three-year period of Table 5 is attached. Average weight per box, 40 lb. Average number of apples per box, 163.

Table 6.

Plot	1.	2.	3.	4.	Check.
Pounds of fruit per tree	533	547	440	587	507

In summarizing the results of Series B both for the year 1919 and over the three-year period covering this experiment, it will be noted that the weaker strengths of lime-sulphur solution have given absolutely satisfactory control of apple-scab in the Vernon District with three applications.

As shown by Plot 1, Table 3, two applications of the stronger mixture, 1 to 35, have given complete commercial control. In spite of this showing, however, in years known as scab years it is advisable to make the third application.

To emphasize this statement, the results of a previous experiment over the three-year period, 1916-17-18, with two applications, pink and calyx stages, showed 3.1 per cent. less fruit free from scab than any other sprayed plot.

In the years 1917-19 early infection of scab was the cause of the greatest amount of injury. In 1918 both early and late infection occurred, with the greatest amount of injury from late infections.

There has been no noticeable injury by sulphur-burning, from the application of liquid lime-sulphur during these experiments, but on plots treated in 1919 with soluble sulphur, burning was in evidence; more data on this compound, also dry lime-sulphur, will be available at the end of the three-year test period.

In comparing the three-year average tree production in Table 6, the writer would point to the fact the trees in this plot run smaller on the average.

II.—REPORT ON EXPERIMENTS FOR THE CONTROL OF GREEN APHIS.

H. H. Evans.

Experiments were conducted on the orchard of B. Weatherly, South Vernon District. Age of trees, three years old. Total trees treated, 117.

The following experiment has been conducted with a view to finding, if possible, a cheap and efficient spray for control of the green apple-aphis; also to test the efficiency of various materials in combination with Black Leaf 40, with special reference to the application on Plot 4.

Table 1.—Materials Test, 1919.

Plot.	Materials tested.	Count taken of Aphis.		Average per Cent. Dead.
		Live.	Dead.	
1	B.L. 40 to gal. to 2,000; L.S. 1 gal. to 40	85	900	91.37
2	B.L. 40 1 to 1,000	19	1,400	98.66
3	B.L. 40 1 to 900; whale-oil soap, 4 lb. to 100	10	1,040	99.00
4	B.L. 40 1 to 2,000; slaked lime 2 lb. to 100	15	2,160	99.30
5	Whale-oil soap 8 lb. to 100	856	680	44.30
6	B.L. 40 1 gal to 2,000; L.S. 1 gal. to 40; slaked lime 2 lb. to 100	556	2,371	81.00

Taking of the check and count of the above plots was performed two days after application, and eight of the most heavily infested trees in each plot was selected for obtaining the count. By a study of the table it may be seen that neither Plot 5 nor 6 compare favourably with either of the first four plots.

Below is given the three-year averages of the above experiment on Plots 1 to 4 and the two-year average on Plot 5. Plot 6 is omitted in Table 2, as 1919 was the first trial given this application.

TABLE 2.—MATERIALS TEST, THREE-YEAR AVERAGE, 1917-18-19.

Plot.	Materials tested.	Count taken of Aphis.		Average per Cent. Dead.
		Live.	Dead.	
1	B.L. 40 1 to 2,000; L.S. 1 to 40	470	2,630	84.84
2	B.L. 40 1 to 1,000	44	2,890	98.50
3	B.L. 40 1 to 900; whale-oil soap 2 lb. to 100	40	3,020	98.70
4	B.L. 40 1 to 2,000; slaked lime 2 lb. to 100	203	4,558	95.73
5	Whale-oil soap 8 lb. to 100	871*	1,415*	61.90

* Two-year average.

All counts taken two days after application.

Table 2 establishes the fact that the application of B.L. 40 and slaked lime, as per Plot 4, will give very efficient control of green apple-aphis where the work is done thoroughly. In addition, to the credit of this formula may be added its cheapness; the cost of application being but 51 per cent. of the second cheapest spray combined with satisfactory control.

III.—REPORT ON CODLING-MOTH CONTROL WORK, VERNON AND OKANAGAN LANDING DISTRICTS.

H. H. EVANS.

Following is the report of control measures carried out by the Department of Agriculture for 1919 in the codling-moth infested areas of the Vernon District; also tables of spray dates, material captured, cost of operation, etc.

The total acreage under treatment in 1919 was approximately 223 acres, divided as follows: Okanagan Landing, 115 acres; South Vernon, 100 acres; Vernon Town, 8 acres. Of this total, actual infestation has been found on about 117 acres. The balance of 116 acres is in what can be described as the danger-zone, same being contiguous to and within a defined area of the infested blocks; the object of the work on this 116 acres is for protection and insurance against the further encroachment of this dangerous pest.

In the season of 1918 the crop on about 50 acres of the Okanagan Landing infestation was acquired by the Department and destroyed before maturity, with the object to, if possible, entirely eradicate the pest from this block, as in 1917 the degree of infestation had been decreased to a small percentage; this, however, has not proved a satisfactory method of control for one year's application, as during the past season about sixty-five worms have been captured on this 50 acres.

SPRAYING.

Formulæ.—A. of L. 2-40 paste; A. of L. 1-40 powder.

Dates of Application.—First spray, May 27th to June 7th; second spray, June 30th to July 11th; third spray, August 19th to 26th.

In the third spray only a portion of the infested area was covered, due to delay in receiving our shipment of arsenate of lead and the serious drawback of water-haulage.

Number of trees banded and sprayed, 11,422. In addition to the above, all fruit for shipment from these trees was inspected; the total number of boxes inspected being 19,401.

LIST OF GROWERS AND APPROXIMATE NO. OF TREES, OKANAGAN LANDING SECTION.

Grower.	Trees.	Grower.	Trees.
J. Mutrie	2,000	R. Swift	330
G. Mickleborough	2,300	C. O'Keefe	450
J. Wylie	500	C. Fulton	170
W. C. Calhoun	100	M. L. Donaldson	150
A. J. L. Clark	100		
H. B. Smart	425	Total	6,525

W. F. van Antwerp, J. Weeks, P. R. Phillips, J. A. Munroe, M. Munroe, R. Peters, B. Johnson, J. Ollerhead, W. Peters, R. Curtiss, P. R. Finlayson (per H. Card), P. Welch, F. B. Phillips. These growers have small home orchards totalling approximately 600 trees.

SOUTH VERNON SECTION.

Grower.	Trees.	Grower.	Trees.
W. Whalley (now Mr. Woitte)	280	L. Harris	150
T. Graham	190	Miss Harris	125
B. Weatherley (now Mr. Black) ...	250	B. Scott	140
J. Burrows	325	W. H. Baxter	260
J. Fuhr	100	Mrs. Gorbett	275
F. Henry	225	S. Boonde (late J. Carson)	160
J. Carron	346	G. N. Kearns	100
P. Burns	150	J. Campbell	110
J. Massey	251	J. Ripley	200
W. Jennings	50		
T. S. Fryer	260	Total	4,247
W. H. Thornton	300		

VERNON TOWN.

G. E. Wright, C. Christian, J. A. Morrison, Dr. J. W. Arbuckle, J. Highman, R. Stevenson, G. Dobie, Bickford Estate, J. Bellevue, Ellison Estate, Wm. Forrester, J. C. Agnew, W. J. McDowall, A. L. C. Madden, J. Campbell, Mrs. A. Olliver, E. D. Watts, Mrs. Stainton, W. H. Clark, R. Swift, W. H. Smith, P. Dickson, P. Rogers, J. Smith, H. Laing, F. Smith, Hankey & Co., G. Adams. The above lot-owners and a few others unknown have approximately 8 to 10 acres all told, being spread over about 100 acres area of the town; approximately 650 trees.

No. of trees, South Vernon	4,247
" Okanagan Landing	6,525
" Vernon Town	650
Total No. of trees	11,422

INSPECTION OF BANDS AND FRUIT—DATES AND MATERIAL TAKEN.

Old Infested Area A, Okanagan Landing.

Orchard-owner.	Band Inspection. 1st, July 4 to 9.	2nd, June 30 to Aug. 9.	3rd, Aug. 11 to 20	4th, Aug. 25 to Sept. 15.	5th, Sept. 20 to Oct. 6.	6th, Oct. 27 to Nov. 17.	Larvæ.	Pupæ.
J. Mutrie	.....	2 lar.	.....	.....	.....	15 lar.	17	..
"	.....	4 pup.	.....	8 pup.	.....	.....	..	12
G. Mickleborough	.....	4 lar.	.....	.....	4 lar.	44 lar.	52	..
"	.....	3 pup.	.....	.....	.....	.....	..	3
J. Wylie	.....	10 lar.	5 lar.	3 lar.	28 lar.	11 lar.	57	..
"	.....	19 pup.	12 pup.	1 pup.	4 pup.	.....	..	36
R. Swift	.....	.....	1 lar.	1 lar.	.....	1 lar.	3	..
C. O'Keefe	.....	4 pup.	.....	.....	.....	.....	..	4
J. Wylie and J. Mutrie *	.....	.....	.....	.....	.....	.....	1	1
G. Mickleborough †	.....	.....	.....	.....	.....	.....	4	..
J. Ollerhead †	.....	.....	.....	.....	.....	.....	6	..
Totals	.....	.....	.....	.....	.....	.....	140	56

New Infested Area B, Okanagan Landing.

P. R. Finlayson	.....	.....	4 lar.	8 lar.	.....	.....	12	..
"	.....	.....	14 pup.	.....	.....	.....	..	14
H. B. Smart	.....	2 lar.	.....	2 lar.	.....	.....	4	..
J. Ollerhead	.....	2 lar.	.....	28 lar.	.....	.....	30	..
J. A. Munroe	.....	1 lar.	.....	.....	.....	.....	1	..
Totals	.....	.....	.....	.....	.....	.....	47	14

* Over-wintering material. † Captured in fruit by weeks, September 22nd to 30th.

Totals from Okanagan Landing—

Larvæ	187
Pupæ	70
Total	257

Old Infested Area C, Vernon Town.

Orchard-owner.	Band Inspection. 1st, July 4 to 9.	2nd, July 30 to Aug. 9.	3rd, Aug. 11 to 20	4th, Aug. 25 to Sept. 15.	5th, Sept. 20 to Oct. 6	6th, Oct. 27 to Nov. 17.	Larvæ.	Pupæ.
C. Christian	.....	.....	2 lar.	.....	.....	.....	2	..
"	.....	.....	2 pup.	.....	.....	.....	..	2
J. Bellevue	.....	1 lar.	.....	.....	.....	.....	1	..
Totals	.....	.....	.....	.....	.....	.....	3	2

New Infested Area D, Vernon Town.

Ellison Estate (care T. Norris)	.....	3 lar.	5 lar.	1 lar.	50 lar.	.....	59	..
	.....	5 pup.	3 pup.	1 pup.	.....	.....	..	9
E. D. Watts	.....	.....	1 lar.	.....	.....	.....	1	..
"	.....	.....	1 pup.	.....	.....	.....	..	1
J. Highman	3 lar.	.....	.....	.....	.....	.....	3	..
"	2 pup.	.....	.....	.....	.....	.....	..	3
Ellison Estate*	.....	.....	.....	.....	.....	.....	3	4
E. D. Watts†	.....	.....	.....	.....	.....	.....	10	..
J. Highman†	.....	.....	.....	.....	.....	.....	10	..
Totals	.....	.....	.....	.....	.....	.....	94	17

* Over-wintering material. † Captured in fruit by weeks, July 23rd to 31st; October 6th to 11th.

Totals from Vernon Town—

Larvæ	97
Pupæ	19
Total	116

		Per Cent.
Okanagan Landing section, Tables A and B	257	68.90
Vernon Town, Tables C and D	116	31.10
Totals	373	100.00

Old Area Infestations.

	Material captured. 1918.	1918.	Per Cent. of Increase.	Per Cent. of Decrease.
Okanagan Landing	381	190	.....	50.13
Vernon Town	13	5	.....	61.54
Totals	394	195	.....	50.51*

* Average decrease, 50.51 per cent.

New Area.

	1919.
Vernon Town	111
Okanagan Landing	67
Total	178

COST OF OPERATION, CODLING-MOTH CONTROL.

	Cost to Grower.	Cost to Dept.
Spraying—		
Arsenate of lead, 1,200 lb. paste, 259 lb. powder		$ 349 60
Man-labour, 1 man, 107 days at $4		428 00
Man and team, 32 days at $8		256 00
Supplies, material, and repairs		243 78
Freight and cartage		26 53
		$1,303 91
Arsenate of lead, 1,076¼ lb. paste, 229 lb. powder	$347 51	
Man and team, 19¼ days at $8	154 00	
Man-labour, 4¼ days at $4	17 00	
Band and fruit inspection—	$518 51	
Materials and supplies		75 45
Labour, 1 man, 405 days at $4		1,620 00
Foreign-car inspection—		
Man-labour, 1 man, 40 days at $4		160 00
Flash-light batteries, etc.		6 60
		$3,165 96
Gross cost to Department of Agriculture	$3,165 96	
„ Growers	518 51	
Net cost to the Department	$2,647 45	

SUMMARY AND RECOMMENDATIONS.

As can be noted by the figures presented on the preceding pages on fruit and band inspection, foreign-car inspection, and spraying, this work is a big problem, added to the other work which officials of the Department of Agriculture have to handle, and one perhaps not yet fully appreciated by the majority of orchardists and others in studying the field operations of the officials.

The work of codling-moth control in the Vernon District has been such during 1919 as to take up all of the Field Inspector's time from the beginning of May until the end of November; inability to get sufficient labour, inadequate water-supply, and the area being split into so many small holdings add considerably to the work and expense.

Despite these difficulties and the increased area brought under treatment, good headway has been made during the past season's operations, as shown by the percentages of decrease in captures made in the areas under treatment previous to 1919.

The percentage of infestation must appear light when one realizes that a total of only 373 captures have been made in six inspections of the 11,422 trees banded and 19,401 boxes of apples inspected; this last item necessitating the handling of every apple.

The destruction of culls and windfalls have been by no means complete during 1919 operations, and different measures for handling this phase of the problem should be instituted for 1920.

The work of foreign-car inspection is increasing tremendously. During 1918 a total of fifty-eight cars was inspected, and for 1919 to the end of November a total of 378 cars, with a total capture of worms to the number of 230; added to this were many Canadian Pacific Railway cars of which no record is kept.

Owing to the unsatisfactory manner in which the Canadian Pacific Railway employees carried out the destruction of refuse swept from foreign cars, the Department from early September on has undertaken the clearing-out and burning of this refuse. These cars are undoubtedly a serious avenue of infestation, as it was noted by your Inspector that Car No. 95865, N.P., inspected July 25th, contained sixty empty pupal cases and two pupæ, which were captured. The ventilators of this car were open, and evidently sixty moths had made good their escape; it is impossible to say where, but might easily have happened in British Columbia anywhere along the line of transit, as at this time first brood-moths were in flight.

In view of this, it is suggested that some method by superheating for the destruction of codling material contained in foreign cars be instituted, and the work done outside of the fruit belts if possible.

REPORT OF DISTRICT FIELD INSPECTOR, SUMMERLAND.

J. TAIT.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—The Districts of Summerland, Peachland, and Westbank have passed through another most successful season. (Excepting for the untimely early frost in October, which caught many growers unprepared; for loss in apples *see* another part of this report.) The districts were fairly free from serious pests and diseases, excepting Summerland, where the blister-mite on apples has got a hold in three sections. In the Westbank District, which has been quarantined for codling-moth for the past five years, field-work and inspection resulted in no moths being found. The spraying of stone-fruits was not as thoroughly done as last year owing to the lack of spray-machines; but the growers are realizing more and more the advisability of more spraying, and many new spray-machines will be operating next season. The fire-blight disease in Summerland this year was not so very severe, mostly twig-blight. The good clean-up last spring helped considerably in checking this disease. Woolly aphis is causing some trouble in some orchards, also powdery mildew on apples.

INSPECTION-WORK.

Fruit and vegetable express shipments from this district were very heavy and inspection entailed much evening work. The stone-fruit on the whole was up to the usual standard, but several cases of peaches and apricots were turned back for repacking, having some wormy fruit. Kept close inspection of all export shipments, also shipments to Ontario, by visiting the various packing-houses, and kept watch for anything new in pests. The codling-moth work at Westbank was conducted along same lines as last year—two sprayings and three band inspections. Another band inspection was to be done, but the extreme cold weather prevented it.

PAPERS READ AT MEETINGS.

It was your Field Inspector's privilege to lead in discussion with the members of the United Farmers' Association, Trout Creek; subject, "Grafting and Budding." At Peachland with the members of the Farmers' Institute; subject, "Sprays and Spraying." At Westbank with the members of the Farmers' Institute; subject, "Soil-fertility and Irrigation." Also attended pruning demonstrations at Kaleden, Naramata, and Experimental Farm, and gave some hints on pruning at Peachland and Westbank; also gave some instructions in packing at Walters, Limited, and T. J. Garnett's, to some new-comers.

FALL FAIRS.

Helped to judge fruit, vegetables, and grains at Quesnel and Smithers Fall Fairs. Separate reports were sent in to the Department. Gave considerable help to the directors at the Summerland Apple-show.

During the season the following officials were shown over the district: J. W. Eastham, Plant Pathologist; F. M. Clement, British Columbia University; R. C. Treherne, Dominion Entomologist; E. W. Buckell, Inspector of Codling-moth; A. McMeans, Dominion Seed Specialist.

GENERAL CONDITIONS OF ORCHARDS.

Pruning operations have not commenced yet owing to the extreme low temperature that has prevailed for the past four weeks. There are some blight-cankers and blighted limbs on apples to be cut out this season. Trees did not make a strong growth this year owing, no doubt, to the heavy crop produced. In many orchards the leaves are still clinging to the trees.

Gave considerable time to helping returned men who have taken up orchard-work on their own in this district. Also helped directly to put seller and buyer of live stock (cows and hogs) in communication with each other, whereby sales were effected.

As apple-mildew is getting more prevalent in many orchards, would like to see some experiments for control.

Estimated Loss by Early Frost.—Summerland, 31,000 boxes of apples; Peachland, 6,000 boxes of apples; Westbank, 2,500 boxes of apples.

Respectfully submitted.

JOHN TAIT,
District Field Inspector.

A typical young orchard on the Penticton Benches, Okanagan Valley.

A McIntosh Red apple orchard at Penticton, in the Okanagan Valley.

REPORT OF ACTING DISTRICT FIELD INSPECTOR, KELOWNA.

T. M. Anderson.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

Sir,—I respectfully submit report of my work from March 17th to December 31st, 1919.

Fire-blight.

On taking over my duties in March I found a considerable amount of fire-blight in this district. With the assistance of Mr. Paret and Mr. Barber, we were able to make an orchard-to-orchard inspection and to make a fairly good clean-up of this disease. In nearly all cases we had the co-operation of the growers, and in no case did we find it necessary to adopt stronger measures than persuasion.

During the past summer there have been slight outbreaks of this disease, and most of my time has been taken up visiting orchards affected. In some cases it has been necessary to visit some orchards three and four times. There is still a small amount of fire-blight left, and I have strongly advised growers to have a thorough clean-up during the coming winter.

Spraying.

Spraying is not carried out as it should be in this district. Notwithstanding this, there has been no serious outbreak of any kind. In the Glenmore District there was a fair amount of scab and woolly aphis, due to the fact that there is a very serious shortage of water during the spraying season. This shortage, it is hoped, will be overcome during the coming season. Blister-mite made its first appearance on Rome Beauty apples in an orchard on the K.L.O. Benches, and as no control measures were used the crop was badly damaged.

During the past month three car-loads of spraying-machines have been sold in this district, and it is hoped that a large amount of good work will be done during the coming season.

Crops and Weather.

The fruit-crops in this district were the heaviest on record. Prices were high and so were the spirits of the growers. The spring opened up late, followed by a very dry summer. Very little rain fell from early in May until October. The third week in October frosts were experienced, and owing to the shortage of cars and the difficulty of obtaining shook many thousands of boxes of apples were still on the trees. A careful examination of this fruit failed to show any appreciable damage, the only apparent defect being a slight premature maturing which would probably shorten the keeping qualities. Zero weather was experienced on October 10th and 11th and the estimated loss has been computed at a minimum of 50,000 boxes.

Onion-crops showed a small increase over last year and was marketed in good condition. Potatoes, owing to dry season, were almost a complete failure. Tomato-crop was very short this year, and owing to the early frosts about 50 per cent. decrease of last year's crop only was used in canneries.

Packing-houses.

Frequent inspections were made of the packing-houses in conjunction with the Dominion Fruit Inspector. Considerable improvement was noticeable in the systematic handling of fruit, but the houses were much handicapped for want of space owing to the crops being much under-estimated and the very serious shortage of cars and shook.

Owing to the dry season experienced and the want of proper thinning the percentage of small fruit was above the average necessitating heavy culling. A little scab was found in McIntosh apples and I have notified growers.

I have inspected the following for export during the past season: 106 cars to Great Britain; 27 cars to New Zealand; 5 cars to China; 1 car to West Indies; 1 car to Norway.

Office-work.

A good deal of my time has been taken up answering inquiries. Changes in ownership of ranches has been greater than usual during the past year, and there has been a number of soldier settlers locating in this district. There has also been a great demand for Department literature and publications.

Respectfully submitted.

T. M. Anderson,
Acting District Field Inspector.

REPORT OF DISTRICT FIELD INSPECTOR, SALMON ARM AND CANADIAN PACIFIC RAILWAY MAIN LINE DISTRICT.

C. R. BARLOW.

Ben Hoy, Esq.,
District Horticulturist, Vernon, B.C.

SIR,—I herewith beg to submit my annual report of work in my district during the year 1919.

PEST-CONTROL.

Apple-scab, which is by far the most serious economic pest that the fruit-growers in the district have to contend with, has caused comparatively small loss this season. In orchards where efficient spraying was carried out the loss for this disease was negligible. The season has been exceptionally dry and consequently unfavourable for the development of the disease.

Fire-blight, though present in the district, shows no sign of becoming a serious menace at the present time. Your assistant has so far been able to deal with each outbreak in its initial stages, and will make careful inspection of infested orchards during the dormant season and attend to the cutting-out of all hold-over cankers.

Anthracnose (Neofabræa malicorticis).—This disease is making its appearance in many orchards, and while its spread is not so rapid as in the more humid Coast districts, if not controlled, is undoubtedly capable of causing serious damage. The majority of the growers whose orchards are affected are, however, alive to the necessity of controlling the disease and will take steps to do so next fall.

Codling-moth.—This pest occurred at Walhachin in 1916 and 1917. In the spring of 1917 steps were taken by the Department for its control, which were followed up by further work in 1918 and 1919. Although during the work of 1918 no sign of infestation was met with, it was not considered safe to remove the quarantine restrictions. This season the orchards were sprayed by the growers, the bands were inspected three times, and the fruit was examined after picking. No larvæ or pupæ were found in either the bands or the fruit throughout the entire season. It would therefore appear safe to assume that the pest has been eradicated, and that the quarantine restrictions can be safely removed. However, it will be necessary to maintain a careful watch in the district for a possible new outbreak.

Cutworms were again the cause of very considerable losses in the early part of the season. Growers, however, who used the poisoned baits recommended by the Department report very satisfactory control.

San Jose Scale.—At Spences Bridge, where this pest occurred, the orchards originally infested remain free from the scale, but it is still persisting on the wild growth in isolated spots. Spreading from these spots has been largely controlled by cutting and burning all new growth early in the spring. Care will have to be taken to prevent any spreading from these centres of infection, which from the nature of the ground are almost impossible to eradicate.

Oyster-shell Scale.—This pest has caused serious loss in some of the older orchards this season, and where allowed to go unchecked is spreading rapidly. Many growers have of late years abandoned the use of the dormant strength lime-sulphur spray, and this is no doubt to a large extent the cause of the trouble. Your assistant will this year take steps to secure control where necessary.

Apple Fruit-miner (Marmara pomonella).—This insect was found in a small number of apples in an orchard at Sorrento. Should it occur again next year your assistant will endeavour to supply material to the Entomological Branch for the working-out of its life-history and control.

EXPERIMENTAL WORK.

Spraying Experiments.—Experiments on the control of apple-scab were carried out by your assistant at Salmon Arm, the object of the experiment being to determine the minimum strengths of lime-sulphur solution which will efficiently control apple-scab under local conditions. The variation in strengths of solutions used covers a wide range, and very little difference in results was observed in this year's work, excellent results being obtained with even the weakest solutions. This is probably due to the fact that the season was exceptionally unfavourable to the development of apple-scab, and to obtain reliable results it will be necessary to carry on this work through two more seasons.

Liming Experiments.—Three ¼-acre plots situated in various parts of the Salmon Arm District were limed last winter and a ¼-acre check-plot kept in each case. Plot 1 was a heavy clay soil on which hydrated lime was applied at the rate of 3 tons to the acre. The soil on this plot showed a marked improvement in physical condition at seeding-time as compared with the soil on the unlimed plot. Alfalfa was seeded with oats as a nurse crop. The oats showed a considerable increase in yield over those on the check-plot. Improvement in the alfalfa was not so noticeable, but it is probable that the difference will be more marked next season.

Plot 2 was a clay loam soil on which hydrated lime was applied at the rate of 3 tons per acre. Considerable improvement was shown in the physical condition of the soil on the limed plots by seeding-time. Red clover was seeded on both limed and unlimed plots, and not only was the catch very much better on the limed plot, but the growth made was greatly improved. However, the growth did not warrant a cutting being made on either plot this year, but no doubt some interesting data will be available from this plot at the end of next season.

Plot 3 was a sandy loam soil on which hydrated lime was applied at the rate of 3 tons per acre. This plot was seeded with red clover. The seeding was done somewhat late, and unfortunately practically all was killed out by drought. Your assistant has reseeded this plot to hairy vetch, and it is hoped that results will be available next year. Your assistant will arrange the results of these experiments in tabulated form at the end of next season, when full data will have been obtained.

Cover-crop Experiment.—A ½-acre plot of sweet clover seeded late in the fall of 1918 as a cover-crop was allowed to stand over till this fall in the expectation of obtaining a stand to turn under. Unfortunately only about 25 per cent. of the seeds germinated, and this was completely killed out by drought. The plot was ultimately ploughed up and swede turnips put in by the owner.

PRUNING DEMONSTRATIONS, ETC.

Pruning and grafting demonstrations were given by your assistant to growers requesting same. Forty-six demonstrations were given at Salmon Arm, Sorrento, Kamloops, Walhachin, and Lytton.

MEETINGS.

Your assistant attended four meetings of the Salmon Arm branch of the British Columbia Fruit-growers' Association, reading papers on various horticultural subjects. Your assistant acted on the Board of Directors of the Salmon Arm Farmers' Exchange, attending eleven meetings of the Board, and also acted on the committee of the Farmers' Convention held at Salmon Arm in February, and attended four meetings in connection with same.

FIELD INSPECTION.

General field inspection was carried out throughout the season, your assistant making many hundreds of personal visits to growers throughout his district.

FALL FAIR.

Your assistant acted as judge in fruit and vegetable sections at Pritchard, Invermere, and Cranbrook Fall Fairs; also assisted E. W. White at Kamloops Fall Fair.

CROP COMPETITION.

At the request of the Soil and Crop Division, your assistant acted as judge in the Boys' and Girls' Club potato-growing competition at Silver Creek.

NEWSPAPER ARTICLES.

Your assistant has at various times contributed short articles dealing with horticultural subjects to the local newspaper.

GENERAL.

Fruit-trees have gone into the winter in fair condition, and there is every prospect of a good average crop next year. Some damage has probably been caused to the cane-fruits and strawberries by the unusually cold weather in December, which occurred at a time when there was no snow protection. The fruit-crop in this district shows a considerable increase over last year, in spite of the fact that approximately 8 per cent. was a total loss from frost. The vegetable-crop was light, but prices were satisfactory.

Respectfully submitted.

C. R. BARLOW,
District Field Inspector.

RESULTS OF SPRAYING EXPERIMENTS AT SALMON ARM.

Plot.	Date applied.	Clean.	Scabbed.	Boxes per Tree.	Remarks.
		Per Cent.	Per Cent		
1	L.S. 1-30, May 5; L.S. 1-35, May 28; L.S. 1-35, June 24	99.81	0.19	13	Early infections.
2	L.S. 1-30, May 5; L.S. 1-35, May 28; L.S. 1-35, June 24; L.S. 1-60, July 4	99.87	0.13	12½	„
3	L.S. 1-35, May 5; L.S. 1-40, May 28; L.S. 1-45, June 24	98.91	1.09	12	„
4	L.S. 1-40, May 5; L.S. 1-45, May 28; L.S. 1-45, June 24	99.01	0.99	16	„
5	L.S. 1-40, May 5; L.S. 1-50, May 28; L.S. 1-50, June 24	98.76	1.24	11½	„
6	S.W.R.S. 3-45, May 5; S.W.R.S. 2-45, May 28; S.W.R.S. 2-45, June 24	96.23	3.77	14	„
7	Check	43.01	56.99	9	Infection of all ages (90 per cent. early).

REPORT OF ASSISTANT HORTICULTURIST AND INSPECTOR OF FRUIT PESTS, EAST AND WEST KOOTENAY DISTRICTS.

E. C. HUNT, B.S.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report as Assistant Horticulturist and Inspector of Fruit Pests for East and West Kootenay for the year 1919.

LECTURES AND FALL FAIRS.

Lectures on horticultural subjects were given at Willow Point, Harrop, and Shoreacres Farmers' Institute meetings. Fall fairs were attended in the capacity of judge of fruit and vegetables at Natal, Fruitvale, Kaslo, Trail, Needles, Kelowna, and Nakusp. A separate report on each fair with a marked prize-list has been submitted. Your assistant also judged the fruit and vegetables at the Nelson Rose-show and at the Willow Point Women's Institute Flower-show.

EXPERIMENTAL SPRAYING.

Spraying experiments were conducted again this year for the control of apple-scab. These experiments were for the purpose of testing out different spray materials and the different strengths of lime-sulphur.

The locality experiment conducted at Forslund's (Arrow Lakes) in 1917 and 1918 was again carried on this year with the same plots. Bordeaux mixture and soluble sulphur were tested out against lime-sulphur at Willow Point, and weaker strengths of lime-sulphur were tested out in the control of scab at Sunshine Bay. Some sulphur-dusting experiments for scab-control were also made at Willow Point.

The following is a summary of the experiments:—

A. Locality Experiment.—Conducted on same plots as in 1917 and 1918 at Forslund's, near Needles (Arrow Lakes). Variety, McIntosh Red. Trees, twelve years old and in full bearing. (L.S.=Lime-sulphur.)

Table of Plots and Sprays used on each.

Spray.	Plot 1.	Plot 2.	Plot 3.	Plot 4.	Plot 5.	Plot 6.	Plot 7.
Delayed dormant	L.S. 1-25	L.S. 1-25	.....	.....	.....	.....	Check.
Pink	L.S. 1-30	.....	L.S. 1-30	L.S. 1-30	L.S. 1-30	L.S. 1-30	„
Calyx	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	„
14 days later	L.S. 1-35	L.S. 1-35	L.S. 1-35	L.S. 1-35	.....	.....	„
14 days later	L.S. 1-35	L.S. 1-35	L.S. 1-35	.....	.....	L.S. 1-35	„

In making the final count, an average number of apples from all parts of one uniform tree in each plot were carefully examined and notes taken on the scab. In 1917 and 1918 all the apples on one uniform tree in each plot were counted to make up the results.

The table below gives the results of the fruit-counts made on the McIntosh Reds at Forslund's in 1919, as well as an average of the results for the three years, 1917, 1918, and 1919.

Results.

Plot.	No. of Apples counted, 1919.	Fruit free from Scab.	Scabby Fruit.	Culls on Account of Scab.	Total Marketable Fruit.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	492	96.32	3.68	0.40	99.60
1	3-year average	95.70	4.30	0.20	99.80
2	481	91.47	8.53	1.24	98.76
2	3-year average	87.85	12.15	2.01	87.99
3	521	91.90	8.10	0.80	99.20
3	3-year average	95.43	4.57	0.27	99.73
4	454	50.20	49.80	1.76	98.24
4	3-year average	78.83	21.17	0.75	99.25
5	470	19.15	80.85	4.68	95.32
5	3-year average	50.72	49.28	1.83	98.17
6	557	86.89	13.11	1.43	98.57
6	3-year average	88.26	11.74	0.74	99.26
7*	308	0.12	99.88	18.50	81.50 (No. 3's)
7	3-year average	9.71	90.29	35.37	64.63

* Check-plot.

It can be seen from these results, covering the three-year period, that fruit can be produced free from scab, even those varieties most susceptible to the disease, and in an orchard or district where the maximum of infection would take place. In 1917 three sprayings as per Plot 4 gave the best and most economical results; while in 1918 and 1919, Plot 3, with four sprayings, gave the best results. Plot 6, with the pink and calyx sprays and one thirty days later (after the calyx), gave the best results for the money expended. Taking the three-year averages, the results show that to control apple-scab in the Arrow Lakes section it is necessary to put on four sprayings as per Plot 3. From the results of the three-year experiment carried on during 1916, 1917, and 1918 at Nelson, the same number of sprays as per Plot 3 are necessary for the control of scab in the Kootenay Lake sections as for the Arrow Lakes. While at Creston the three-year experiment demonstrated that three sprays as per Plot 4 or 6 were sufficient to control the disease.

B. Material Test or Experiment.—B.M.=Bordeaux mixture. S.S.=Soluble sulphur. L.S.=Lime-sulphur. S.D.=Sulphur-dust (dust-spraying). This experiment or test was conducted on McIntosh Red and Wealthy apples at Willow Point. Trees all of bearing age. Materials: Bordeaux mixture, 2 to 3 lb. of bluestone, 10 lb. of hydrated lime, and 40 gallons of water; soluble sulphur, 1 lb. to 40 gallons of water; lime-sulphur, 1 gallon to 30 or 40 gallons of water, based on a 32-degree Beaume reading; sulphur-dust, 85 per cent. finely ground sulphur, 15 per cent. filler (gypsum), 90 per cent. ground sulphur, and 10 per cent. lead arsenate.

Table of Sprays and Plots.

Spray.	Plot 1.	Plot 2.	Plot 3.	Plot 4.
Delayed dormant	B.M. 3-10 40	L.S. 1-30	S.D. 85%, 15% filler	Check.
Pink	B.M. 2-10-40	L.S. 1-35	S.D. 85%, 15% filler	"
Calyx	S.S. 1-40	L.S. 1-40	S.D. 90%, 10% arsenate	"
14 to 20 days later	B.M. 1-10-40	L.S. 1-40	S.D. 90%, 10% arsenate	"

All the apples on one uniform tree in each plot were picked and carefully examined and notes taken on the scab. The table below gives the results of the fruit-counts made on the McIntosh Red and Wealthy apples.

Results.

Plot.	Apple.	Fruit free from Scab.	Scabby Fruit.	Culls on Account of Scab.	Total Marketable Fruit.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	Wealthy	99.60	0.40	....	100.00
1	McIntosh Red	91.66	8.34	0.27	99.73
2	Wealthy	93.96	6.04	....	100.00
2	McIntosh Red	88.55	11.45	0.40	99.60
3	Wealthy	49.36	49.64	9.70	90.30
3	McIntosh Red	13.05	86.95	13.14	86.86 (No. 3's)
4	McIntosh Red (check)	3.24	96.76	39.59	60.41

NOTE.—Seventy-five per cent. of the marketable fruit in Plot 3 would grade No. 3's and 85 per cent. in Plot 4 would grade No. 3's.

From the above results it will be seen that Plot 1, sprayed with Boredaux mixture and soluble sulphur, gave the highest percentage of clean fruit. Plot 2, sprayed with lime-sulphur, was second; and Plot 3, sprayed with sulphur-dust, was third in percentage of clean fruit.

The McIntosh Red tree counted in Plot 1 had 1,634 apples on it, while the McIntosh Red tree in Plot 2 only had 1,240 apples. The two trees were as near the same size as it was possible to get, and were average trees, in respect to set of fruit, for each plot. Plot 1 gave the best set of fruit, about 15 per cent. better than Plot 2. The lime-sulphur caused some burning to the foliage on the McIntosh at the time of or just after the calyx spray was put on. There was also quite a drop to the fruit on the McIntosh in Plot 2 after the calyx spray, but very little (if any) after the later sprays were applied. Lime-sulphur caused very little burning to the foliage and no drop to the fruit on the Wealthy tree. The Bordeaux mixture with the soluble sulphur did not cause any burning to the foliage or any apparent drop of the fruit. The healthy appearance of the foliage in Plot 1 over that in Plot 2 was quite noticeable up to August 1st, when very little (if any) difference in the condition of the foliage on first two plots could be noticed. On Plot 3 the set of fruit on both varieties was good, no burning to the foliage, but both the foliage and the fruit were very scabby.

Plot 1, which was sprayed with Bordeaux mixture and soluble sulphur, had 47.43 per cent. of the fruit on the McIntosh russeted on account of the burning of the Bordeaux. This russeting lowered 38.65 per cent. of the apples to grades 2's and 3's.

It is hoped that this experiment will be carried on for one or two years longer.

C. Experiment to test Weaker Strengths of Lime-sulphur in the Control of Apple-scab.—Conducted at Sunshine Bay on McIntosh Reds and Jonathans. Trees, eleven years old.

Table of Plots and Sprays.

Sprays.	Plot 1.	Plot 2.
Early pink	L.S. 1-40	L.S. 1-50
Late pink	L.S. 1-40	L.S. 1-50
Calyx	L.S. 1-40	L.S. 1-50
14 days later	L.S. 1-40	L.S. 1-50

The table below gives the results of the fruit-counts made on the McIntosh Red and Jonathan apples.

Results.

Plot.	Apple.	Fruit free from Scab.	Scabby Fruit.	Culls on Account of Scab.	Total Marketable Fruit.
		Per Cent.	Per Cent.	Per Cent.	Per Cent.
1	McIntosh Red	66.13	33.87	1.80	98.20
1	Jonathan	97.50	2.50	...	100.00
2	McIntosh Red	63.78	36.22	1.50	98.50
2	Jonathan	96.55	3.45	...	100.00

It will be seen from the above results that these weaker strengths of lime-sulphur did not give quite as good results in the control of scab on the McIntosh Red as the stronger ones usually applied for these four sprayings. It might be well to point out the fact that these plots were inspected on August 19th and the fruit carefully examined on the trees. Very little scab-infection was to be found on the fruit at this time. At the time of picking the fruit, September 22nd, the scabby fruit was divided into two classes—namely, *early infection*, as shown by the large and medium scab-spots, and *late infection*, as would be shown by the "pin-head" type of scab-spot. The results were as follows: Plot 1, McIntosh Red, showed 27.15 per cent. late infection and only 6.72 per cent. early infection; Plot 2, McIntosh Red, showed 31.02 per cent. late infection and 5.2 per cent. early infection.

To give these weaker strengths of lime-sulphur a fair test in the control of scab, a later spray should have been applied and one of the pink sprays left out. This late spraying put on some time in August would have prevented a great deal of the late infection on the McIntosh. This experiment should be carried on for another year, because if these weaker strengths of lime-sulphur will control apple-scab just as good as the stronger ones usually applied a great saving can be effected in the cost of spraying.

The table below gives the dates on which the different sprays were put on for the three experiments, A, B, and C:—

Spray.	Experiment A.	Experiment B.		Experiment C.
		B.M. and L.S.	Dust.	
Delayed dormant	April 25	April 28	May 1	May 5
Pink	May 7	May 13	May 13, 14	„ 16
Calyx	„ 27	„ 27	„ 28	June 2
14 days later	June 16	June 12	June 12	„ 20
14 days later	July 8	.....	.....	.....

COVER-CROP EXPERIMENTS.

With a view to keeping up and improving the fertility of our orchard soils in the large- and small-fruit areas, the Horticultural Branch of the Department of Agriculture has undertaken the demonstration of cover-crops in a few leading orchards in a number of sections of the Kootenay District. Accurate data are to be kept on these cover-crops, as to their adaptability, cost, and soil-building qualities of the different soils.

The cover-crops that are being tested out in the Kootenay District at the present time are winter vetch and sweet clover. The plats are located at Birchbank, Willow Point, Sunshine Bay, and Creston. Each plat contains about 2½ acres. The vetch was sown at the rate of 25 lb. per acre and the sweet clover at the rate of 16 lb. per acre. It is the intention to run these experiments for three years on the same plats with the same cover-crop. As this is the first year of the experiments, very few data are available to report on.

DISEASES AND INSECT PESTS.

Apple-scab.—This is by far the worst disease in the Kootenay District. The disease was quite prevalent again this year in the Kootenay and Arrow Lakes sections, the rains in mid-August bringing on a very bad late infection. This late infection, however, was confined to those varieties most susceptible to the disease and only where the growers had left off the late spray. A detailed analysis of the results on apple-scab control in the Kootenay District is found elsewhere in this report.

Fire-blight.—This year very little (if any) damage was done by this disease. The different infected trees at Nelson were thoroughly cleaned up during the dormant season and no new infections were found during the year. At Creston two infected trees were found during the spring. This is the first appearance of blight in this district. All infections were cut out thoroughly and no new infections were located during the summer or fall. Close inspection will be required for new outbreaks of this disease during the coming year.

Pear and Cherry Slug.—A very bad outbreak of this insect occurred in the Fairview District at Nelson during August and September, and considerable damage was done to the pear and cherry trees of this district. The insect is quite easily controlled if proper spray measures are used.

Other insects and diseases of the district were of about normal severity, causing more or less damage to the fruit and vegetable crops where proper preventive measures were not adopted. All of the above insect pests and diseases were attended to, as far as time would permit, by making personal calls on growers and giving advice and information on the methods of control and eradication.

ORCHARD VISITS AND DEMONSTRATIONS.

Many personal visits to different orchards of the district were made during the year; a great number of requests coming in from growers for demonstrations and advice on various horticultural subjects. This line of work takes up an increasing amount of time, but is very valuable and much appreciated by the growers.

CROP REPORTS.

Crop estimates and reports are furnished from time to time during the growing season, and at the end of the year a detailed report is made of the total production of all fruits and vegetables in the district. Information and data are also collected in a similar way from the jam-factories of the district. These reports have been submitted to the Department.

OFFICE-WORK.

There has been a largely increased amount of correspondence during the year. Many inquiries were received and answered on matters connected with horticulture in this district. The necessary correspondence with the Department and other office duties were also attended to.

During the shipping season your assistant was called upon to inspect export shipments of fruit and also to advise *re* various diseases and pests in connection with shipments.

Respectfully submitted.

E. C. HUNT,
Assistant Horticulturist and Inspector of Fruit Pests.

REPORT OF DISTRICT AGRICULTURIST AND FIELD INSPECTOR, CRESTON.

C. B. TWIGG.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as District Agriculturist and Field Inspector for East Kootenay and that portion of West Kootenay south of Kootenay Lake for the month of December, 1919.

I was appointed to this position since my discharge from the army on December 1st, 1919, with headquarters at Creston, and during that month I spent most of the time in Mr. Hunt's office at Nelson, making myself acquainted with the nature of the work entailed and helping him in office routine.

Since taking up my residence in Creston requests have come in from growers to visit their orchards and I have given advice in various horticultural subjects to growers. All necessary correspondence was carefully attended to.

All of which is respectfully submitted.

C. B. TWIGG,
District Agriculturist and Field Inspector.

REPORT OF PROVINCIAL PLANT PATHOLOGIST.

J. W. Eastham, B.Sc.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit herewith my annual report for 1919.

New Diseases.

No disease of commercial importance not previously recorded has been noticed during the past season, but a number that have hitherto attracted little attention have been, for one reason or another, more prominent.

Yellow Rust of Raspberries (Phragmidium imitans).

This is a native fungus which occurs on several species of wild *Rubus* throughout the Pacific slope from California to British Columbia. The early stage of the disease appears as little yellow spots on the leaves the size of a pin-head or smaller. These may be very numerous, a single leaf showing many hundreds of such infections. In such cases the leaf-tissue is damaged, the vitality reduced, and in hot, dry weather such leaves wither and fall prematurely to the detriment of the developing crop.

The disease is very different from the so-called orange-rust (*Gymnoconia interstitialis*) of Eastern Canada and United States, not only as regards the technical character of the causal fungus, but in general aspect and mode of growth. This latter disease is characterized by the bright orange-red colour of the spore-masses, which are large and almost continuous over the entire surface of the leaf, so that an affected plant is conspicuous from a distance. The mycelium is perennial in the roots and the only remedy is to dig up and destroy the attacked plant.

This disease has so far not been found in British Columbia. Our native rust, which is here called the yellow rust to distinguish it, was unusually prevalent, especially on red raspberries, in the spring of 1919 and many inquiries were received. A large plantation at Burnaby was so severely affected that hardly a leaf could be found free from rust-pustules, while many leaves showed hundreds of infections.

Considerable anxiety was manifested by growers, especially as it was not possible to predict from previous experience how serious the results might be. Careful observation was therefore kept of such plantations. It was found that the results hardly warranted serious alarm. The summer of 1919 was exceptionally dry and the combined causes of drought and rust together did not reduce the yield on an average more than 20 per cent. below that of 1918. There seems reason, therefore, to suppose that the disease is not likely to become a serious menace to the grower of small fruits or to render it necessary to take special measures to combat it. However, where it is practicable, it would be a good thing to rake together the fallen leaves and burn them, as in this way large quantities of spores would be destroyed.

Bacterial Blight of Walnuts (Pseudomonas juglandis).

This attacks leaves, young shoots, and, more particularly, the young nuts, often causing the loss of the entire crop. It is the worst enemy of the walnut-grower in the Pacific States.

During the past season we received inquiries regarding a trouble of young walnuts in the vicinity of Vancouver, and examination showed practically every nut to be diseased with bacteriosis, the entire crop being destroyed. In this particular case the commercial value of the crop was not of special importance, but in view of frequent recommendations for the planting of English walnuts on the Lower Mainland it is important to recognize that this destructive disease is already present here and may become very severe in certain seasons under our conditions.

No satisfactory control measures have been found. Different varieties, however, are known to vary greatly in susceptibility in California. While resistance often varies under new conditions, it would be preferable, at least, to use those varieties which have been found resistant elsewhere, in starting a plantation, until some experimental data of our own are available. It has also been found that late-blooming varieties often escape the disease, while earlier varieties suffer severely, infection taking place as a result of foggy, damp weather. These considerations would probably apply also under our conditions. The disease has so far not been recorded from the Interior.

Western Tomato-blight.

This resulted in considerable loss to tomato-growers in certain parts of the Southern Okanagan during the past season, occasionally as many as 25 per cent. of the plants in a field being affected. Affected plants appear dwarfed and sickly; the leaves curl and turn yellow, while the veins become purplish in colour, giving a purplish tinge to the leaf. The fruit does not mature and the whole plant dies prematurely.

This disease is apparently due to a fungus present in the soil which attacks the roots through injuries made at the time of transplanting. No remedy is known, and from the nature of the disease it is not likely that any direct means of treatment will be found satisfactory. There is, however, much difference in the powers of resistance among plants in the same batch growing under the same conditions, and there is every reason to believe that by selection of seed from these resistant plants growers can build up strains of tomatoes showing a high degree of resistance to the disease under their particular conditions. This seems to be the most promising line of defence against this and similar diseases.

Cane-blight of Raspberries (Leptosphæria coniothyrum).

In previous years, in certain places, considerable loss has been attributed to this disease. There is no doubt that it can be serious and has been found so in many places, both in the East and in the West of the continent. There is evidence, however, that the worst cases of injury in this Province which have been attributed to this disease have been partly, if not mainly, due to other causes. The worst affected plantations are on land which, although it has a good slope and is tile-drained, has an irregular hard-pan which comes close to the surface at numerous points, forming pockets. As a consequence, some plants are killed outright as a result of "wet feet" and winter injury, while others, which are injured to a less degree, are nevertheless root-injured and sickly. Such canes succumb to an attack of cane-blight which might not prove serious to healthy plants. A good deal of the damage with which cane-blight is associated is probably due to these physical conditions more than to the disease itself.

Other Diseases and Pests of Small Fruits.

With the great extension of the areas under small fruits in the next few years, it is only to be expected that diseases and pests will also have a chance to multiply. It is highly important that growers take every reasonable care in what may be termed sanitary precautions in caring for their plantations. This means the cutting-out of old canes, and the destruction of them and other refuse as quickly as possible, instead of leaving them to lie around indefinitely. Also a careful watch for the earliest signs of infection and the destruction, preferably by burning, of diseased or infested plants. During the past season certain diseases and pests have been noticed more frequently than in previous seasons, and it is probable that these are actually on the increase; for instance, the anthracnose of the raspberry (*Glœsporium venetum*) and rose-scale (*Aulacaspis rosæ*). Crown-gall on the canes, which proved troublesome a few years ago on the Snyder blackberry on the Government experimental plots at Chilliwack, has also been noticed as occurring quite severely on the loganberry. The only remedy is to cut out all diseased canes and secure conditions for good growth. It is quite probable that the new canes will show it to a much less extent. In this way the disease was brought under control on the experimental plot.

Experimental Work.

Apple-tree Anthracnose.—The three years' spraying experiment conducted in conjunction with Mr. White, of the Horticultural Branch, has now been concluded and the results have been very satisfactory. A detailed account of them has been published in the *Agricultural Journal*, and it is only necessary here to allude to one or two of the more important results.

First: 3-4-30 Bordeaux mixture has proved to be sufficient in most cases instead of the old 8-8-40 formula. This reduces the cost of materials to about one-third of that under the old formula.

Secondly: Spraying when the fruit is still on the tree has not increased the cost of handling the fruit, at least in the case of winter varieties which are stored for some time before picking and shipping. The Bordeaux mixture has been found to disappear from fruit during such storage. The chief objection on the part of the grower to spraying early enough to protect the trees is thereby removed.

Thirdly: Sprayed apples have shown much less rot in storage. Anthracnose being well known to cause a rot of the fruit, control of the disease on the tree naturally means sounder fruit, while spraying when the fruit is unpicked gives direct protection against infection.

The cost of the necessary early spray averaged about 14 cents per tree during the three years' experiment, which is a small amount to pay for insurance against this disease.

Potato-spraying.—This year the experimental work for this purpose was carried out in only two locations—one at South Sumas and the other near Sullivan. The primary purpose of this experimental work was again frustrated owing to the fact that the unusually dry season prevented a development of the destructive late blight (*Phytophthora infestans*). Incidentally, however, some valuable information was gained. Early blight (*Alternaria solani*) was very bad on the Sullivan plot and reduced the yield materially, the foliage being blackened and killed several weeks before it should have been. One of the main purposes of this experiment was to determine whether spraying against late blight could be postponed until later in the season, say early in August, epidemics having been observed to occur only late in the season. It has at least been conclusively proved that this would not be sufficient. Even with our comparatively moist climate of the Lower Mainland, early blight has shown itself exceedingly destructive in certain seasons like that of 1919, and it will be necessary to begin spraying when the plants are from 6 to 9 inches high to obtain proper protection against this disease. It is also indicated that such a spraying will give better protection against late blight, as it will give a better covering of the spray materials to the lower leaves where the blight begins. In the later stages of growth, when the plants are large and spreading, it becomes very difficult to fully cover the lower and interior foliage.

Another result of the work was to show very clearly the good results of proper seed-selection. The seed for these plots was very carefully selected, especially as regards freedom from disease, and also disinfected with formaldehyde. The plot at Sullivan occupied one portion of a field of potatoes, the remainder of the field not having been planted with selected seed. In the experimental plot, only a small proportion, varying from 1 to 5 per cent. of the plants, showed *Fusarium* wilt, while in the other portion of the field the percentage of *Fusarium* infection was from 10 to 25 per cent. These *Fusarium* diseases appear to be on the increase. This is especially the case where, as in so many areas, the cultivation of potatoes is largely in the hands of Chinamen. Seed-selection is the only means of controlling these diseases, and it is almost impossible to get the Chinese grower to pay any attention to this. It appears to be a maxim with him never to use for seed anything that is saleable for any purpose.

Apple-mildew.—This Branch did not directly undertake experimental work in this connection, but the Plant Pathologist gave an address on the control of the disease at the British Columbia Fruit-growers' Association and later at the Farmers' Institute at Penticton. Later he visited several growers in the Penticton District who wished to take measures against this disease and gave them further instructions.

Spraying with lime-sulphur concentrate 1 to 40 when the blossoms are showing pink and again after the petals fall was carried out. Some of the orchards had suffered from a bad attack of powdery mildew the previous season, and the growers were beginning to be alarmed about the ultimate results of the spread of this disease. Two inspections for this disease made during the summer where the spray measures were carried out indicated considerable improvement as the result of the sprayings. Owing, however, to the exceptionally dry season, mildew did not have much chance to spread later in the season, and ultimately there was not a great deal of difference between the checked trees and the sprayed ones. There is little doubt, however, that these sprayings persisted in will prevent powdery mildew from becoming a serious pest with the apple-grower, as it is not a disease of much consequence in those parts of the Province where climatic conditions render spring and early summer sprayings a necessity for the control of other diseases such as apple-scab.

Other Work.

I attended the summer school for agricultural instruction to teachers held at Victoria in July and gave a short course of lectures and demonstrations on bacteriology and plant-pathology. I have also been giving from five to eight afternoons per month for the past six months to instruction-work in connection with the Soldiers' Civil Re-establishment classes held by the University of British Columbia at its Point Grey site. My work has dealt with practical measures

for controlling the various plant-diseases and insect pests which the agriculturist or fruit-grower has to combat in this Province. This work has been, I believe, of considerable help to the men who are taking up land and is much appreciated by them.

I attended the convention called at Portland, Oregon, on April 21st and 22nd last to consider ways and means of protecting the Pacific slope against the possible introduction of white-pine blister-rust, which has now become well established in the eastern part of the continent. On my return a report was submitted and a new regulation was subsequently added to those of the Board of Horticulture covering this point. This regulation, taken in conjunction with the restriction on importation and transportation of carriers of the disease by the Dominion Government, should give adequate protection to the Province.

VERNON OFFICE.

As in the previous year, this has been the headquarters of R. C. Treherne, of the Dominion Entomological Branch, and Mr. Ruhmann has carried out work under his direct supervision. Mr. Ruhmann's report follows in detail.

Respectfully submitted.

J. W. EASTHAM,
Provincial Plant Pathologist.

REPORT OF ASSISTANT PLANT PATHOLOGIST.

M. H. RUHMANN.

J. W. Eastham, Esq.,
Provincial Plant Pathologist, Vancouver, B.C.

SIR,—I have the honour to submit the following summary of work in the Okanagan District for the year 1919, under the direction of R. C. Treherne, B.S.A., Dominion Field Officer for British Columbia:—

The major subjects of the season's work were the study of the life-history and control of the onion-maggot (*Phorbia ceparum*) and control experiments with the cabbage-root maggot (*Phorbia brassicæ*).

The minor subjects for the year: (*a*) Arranging insect specimens and photographic displays for farmers' fairs and exhibitions; (*b*) arranging specimen mounts and photographs for the offices of Agricultural District Representatives and Farmers' Institute rooms throughout the Province; (*c*) the collection in the field and breeding of specimens to be used under (*a*) and (*b*); (*d*) to take charge of the library of the Horticultural, Plant Pathological, and Entomological Branches of the Provincial Department of Agriculture's offices at Vernon; (*e*) to act as curator of the entomological collection at Vernon. The insect collection is now in good order and fairly representative of the insect fauna of the Interior.

ONION-MAGGOT.

Life-history.—The life-history of the first brood of this insect was secured for the year 1919, also considerable notes on the second brood. This study will be continued during 1920.

Control.—Experiments were conducted with poison baits as recommended for the Eastern Provinces. These proved quite ineffective under our conditions.

Observations.—Heavy oviposition was noted on volunteer onions. These are usually removed at the first cultivation. Instructions were given to allow a large percentage of these to remain in the field for further observation, from which the following facts were obtained: Oviposition was entirely confined to the volunteer onions over the heavy oviposition period. As many as 563 eggs were collected from one volunteer plant between May 22nd and June 13th. This covers the main period of heavy oviposition of the first brood. Light oviposition on seedling onions was first observed on May 24th, but did not become general until June 3rd and continued until August 14th. As a second generation was in evidence on August 7th, it is evident the oviposition of the first and second brood overlap. The height of larval infestation was reached on June 16th. As thinning of the onion-crop is generally commenced early in June, it is evident that heavy oviposition by the first brood may result after the crop has been thinned. In this experiment thinning was withheld until the height of larval infestation had been reached, and thinning

was commenced on June 16th, the volunteer plants being removed at the same time and with the thinnings from the seedlings were burned at the end each day's work, thereby destroying the largest possible percentage of the first-brood larvæ and resulting in a second brood of little economic importance to the crop.

The summary of conclusions reached on the season's work for control measures are as follows:—

(*a.*) Save the small cull onions from the season's crop and plant an occasional short row of these the following spring in the newly seeded onion-field as a trap-crop. (Have the culls sprouted before planting.) Plant 3 inches deep.

(*b.*) Commence thinning the crop on June 16th, taking up the trap-crop at the same time. In thinning take out all seedlings that are drooping and wilting, as these will contain maggots. Destroy all thinnings and trap-crop onions by burning at the close of each day's work.

In the experiment it was found that infestation of seedlings at the time of thinning did not exceed 20 per cent., which left a practically clean crop after thinning. The poison baits were found to be of no practical value for the Dry Belt and cultural methods must be entirely relied upon.

Cabbage-maggot.

Although satisfactory results were being obtained with tarred felt disks on cabbages, a comparative test was undertaken at the request of the Dominion Entomologist with a bichloride of mercury treatment. A suitable planting of cabbages and cauliflowers for the experiment was found at Armstrong. A block of approximately 2,000 cauliflowers was selected for the experiment, with several acres of cabbages in the same field for comparative observations. The results were very satisfactory in every way, although the experiment had to be discontinued early in June owing to severe frost destroying the cauliflowers.

The results show that with three treatments of bichloride of mercury at a strength of 1 oz. to 6, 8, and 10 gallons of water the results were, on June 5th, maximum infestation 1.8 per cent., as compared with check-plots 76.5 per cent. and tarred-disk plots 25.3 per cent. On cabbages observations show that tarred-disk plots had approximately 5 per cent. infestation, check-plots 50 per cent. infestation. None was treated with the mercury.

The results show that for cauliflowers the tarred-disk treatment is not satisfactory. Furthermore, there was distinct injury to a further 36 per cent. of the cauliflowers, mainly due to the tarred disks applied, showing that they are injurious to the plants on moist bottom lands.

The mercury was applied with a watering-can having the rose removed, about ¼ pint being applied to the base of each plant, the quantity being increased slightly at each application, sufficient being applied to moisten the soil encircling the base of each plant.

Considerable time was also taken up with correspondence and the determination of insect and other material.

The fall fairs at Armstrong, Kelowna, Naramata, Penticton, and Summerland were attended and exhibits of insect pests and plant-diseases were displayed. These appear to have been thoroughly appreciated at the respective fairs.

Respectfully submitted.

M. H. Ruhmann,
Assistant Entomologist.

REPORT OF CHIEF INSPECTOR OF IMPORTED FRUIT AND NURSERY STOCK.

W. H. Lyne.

Dr. David Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith my report of the work carried out by your Inspector of Imported Fruit and Nursery Stock and his staff of assistants during the year 1919.

The duty of this Branch of your Department is the inspection of horticultural and field products imported into the Province of British Columbia, and into other parts of Canada by way of this Province, for the purpose of preventing the entry of any injurious insect pests or disease. In order to carry out the work as intended all importations requiring such treatment are also subjected to fumigation, and, if infested or infected with certain pests or diseases of sufficient importance, may be destroyed or shipped out of the country.

INSPECTION AT ENTRY-PORTS.

Quarantine Officers are stationed at the several entry-ports to inspect all fruit, vegetables, rice, corn, peas, beans, etc., and render their reports to your Inspector each month, together with inspection fees charged for such work. Your Inspector in turn forwards such reports and inspection fees to your Department at Victoria, after recording all details regarding them at the office in the Court-house at Vancouver.

VANCOUVER OFFICE.

At the Vancouver office, being the headquarters of your Inspector, all details and correspondence dealing with the inspection of imported fruits, vegetables, nursery stock, etc., are there on record. The office is equipped with horticultural, entomological, and plant-pathological text-books, microscopes, etc., for reference and investigation. A laboratory is also provided for J. W. Eastham, your Plant Pathologist, who makes it his headquarters. The agricultural and horticultural bulletins for public distribution are always on hand. Thus equipped, the Vancouver office has become a very popular information bureau.

Number of letters received, 588; number of letters sent out, 853 (not including Mr. Eastham's correspondence). (Miss Hawes is our recording clerk and stenographer.)

QUARANTINE STATIONS.

Quarantine Officers or Assistant Inspectors are stationed at the following entry-ports: Vancouver, four men, including New Westminster; Victoria, one man, with an occasional assistant; and one man at each of the other stations: Prince Rupert, Abbotsford-Huntingdon, Osoyoos, Similkameen, Bridesville, Myncaster, Midway, Grand Forks, Cascade, Waneta, Rossland, Trail, Kingsgate, Newgate, Cranbrook, Fernie, and Revelstoke.

The four men stationed at Vancouver are on regular salary, the other twenty men being paid for actual time spent inspecting shipments whenever they arrive.

NEW APPOINTMENTS.

Your Inspector paid a visit to each of the Quarantine Officers during the month of July, with the exception of officers stationed at Prince Rupert and Revelstoke. A visit was made to Prince Rupert during September at the time your Inspector acted as judge at the annual fair, Revelstoke being the only place omitted. Each officer was apparently endeavouring to fulfil his duty to the best of his ability and was given special instruction regarding details of his work. This being the time at which the summer importations of fruit were being received, your Inspector was able to give a few practical lessons to good effect.

The following new Quarantine Officers were appointed during the year: R. H. Eby, at Abbotsford, taking the place of P. R. Peele, who was leaving the district owing to being appointed Collector of Customs at New Westminster; on July 9th R. W. Grigor, Customs Officer, was appointed Fruit Quarantine Officer at Rossland in place of R. T. Evans, who was leaving to take up private business in Spokane; on July 19th Andrew Porter, Customs Officer, was appointed at Myncaster to take the place of Mr. Bruce, who changed his residence to another part of the country. M. L. Bird returned to his duties on the Vancouver staff after two years' military service in France.

REGULATIONS AMENDED.

Certain clauses in the Horticultural Regulations were amended in order to more clearly define the details of procedure and a few alterations were made in the scale of inspection and fumigation fees.

NURSERY STOCK INSPECTED AT VANCOUVER.

All imported nursery stock consisting of trees, shrubs, and plants, scions or cuttings are forwarded to Vancouver, where proper facilities are provided for their inspection and fumigation, the Provincial officials carrying out both the Dominion and Provincial regulations, thus avoiding duplication of work. All such work is handled with the utmost care and dispatch, the respective transportation companies being notified immediately the consignment is ready for forwarding to destination.

There have been a few complaints from consignees regarding Eastern shipments for Kootenay and Okanagan having to come to Vancouver for inspection and fumigation. They also request that such work be carried out at the eastern end of the Province. The present system, however, has strong points in its favour if properly complied with. The shipper should be instructed to bill to destination "via Vancouver for inspection." By so doing the shipments would come direct with very little delay. The cost of transportation is the same to the consignee as though he received his shipment direct. No charge is made from Vancouver to destination.

The facilities for handling stock at the Vancouver Inspection Station are such as to give it every chance of reaching the consignee in as good condition as if it had gone direct. It would cost the Government a considerable sum to erect and equip another fumigating station and provide extra officials and labour for the comparatively small amount of nursery stock shipped in from the East to the eastern parts of the Province at present, although conditions may change and warrant the extra provision. At present it is far better to have one well-equipped station with a properly trained staff of Inspectors and packers than two or three crude arrangements where the work could not be carried out as thoroughly and efficiently.

A classified list of all nursery stock imported into the Province during the year as compared to the year previous is included in this report, also the amount condemned and rejected. Complete lists are also given of all fruit, vegetables, rice, corn, peas, beans, etc., that have been inspected at the several entry-ports. There is also a list of rice, corn, beans, peanuts, etc., fumigated at the Vancouver and Victoria fumigating chambers, the Victoria chambers being devoted to that work only.

INSECT PESTS AND DISEASES.

Insect pests and diseases for which imported nursery stock has been condemned are as follows: Several species of scale-insects, including San Jose scale (*Aspidiotus perniciosus*), European scale (*Aspidiotus ostræformis*), blackberry and rose scale (*Aulacaspis rosea*), oyster-shell scale (*Lepidosaphes ulmi*), cottony cushion-scale (*Pulvinaria innumerabilis* and *Icerya*), *Lecanium* scale (*L. hemisphæricum* and *L. hesperidum*), *Diaspis* and *Chionaspis*, peach- and plum-root borer (*Sanninoidea exitiosa*), blackberry-crown borer (*Bembecia marginata*), grape *Phylloxera*, eggs of gipsy-moth, root-aphis (*Eriosoma lanigerum* and *Eriosoma pyri*). Diseases: Blight (*Bacillus amylovorus*), anthracnose, crown-gall, and sour-sap.

SHORT ON NURSERY STOCK.

Nursery stock has not been so plentiful during the last three or four years, and there appears to be a shorter supply than ever this season, especially certain varieties of standard fruit-trees. The principal reason for this is probably the fact that most nurserymen have been carrying less than usual in order to economize. In former years they lost heavily by overstocking.

Importations of ornamental trees and shrubs from Holland promise to be numerous this coming spring.

FROZEN STOCK.

A car of ornamental trees and shrubs from Holland for a local nurseryman arrived on December 15th severely frozen, necessitating careful thawing-out before the stock could be inspected (some of which will be a total loss).

Several small shipments from the United States have arrived in a frozen condition also, but careful attention to the process of thawing-out has so far resulted in very little loss.

About twenty cases of ornamental shrubs very recently arrived from Yokohama Nursery Company, Japan. This gave us very little trouble regarding pests or disease, which is a great improvement as compared to former years.

PANAMA ROUTE.

There is a prospect that most of the nursery stock from England, France, and Holland will be shipped via the Panama Canal in future, and thus escape the danger of frost incurred by shipping overland during the winter. A new firm of importers informed your Inspector they were considering the Panama route in anticipation of shipping in three or four car-loads of stock from Holland to arrive early this coming spring, providing direct connection could be made with Vancouver without transfer.

FRUIT AND VEGETABLES.

Fruit and vegetable importations have been fairly regular during the year, including a considerable quantity of certain varieties that could have been produced in our own Province, although each succeeding year gives evidence that home production is gradually increasing.

Your Inspector and his assistants have earnestly endeavoured to prevent any serious insect pests or disease entering the Province, and several shipments of apples and pears infested with codling-moth have been rejected, besides other fruits and vegetables, such as peaches, plums, and apricots infested with peach-worm and scale-insects, brown-rot, and other fungus-diseases; Mexican tomatoes infested with cotton-boll or tomato-worm and fungus-disease; sweet potatoes and yams infested with weevil and rot. All common potatoes are carefully inspected for tuber-moth, canker, or other serious fungus or bacterial disease; fruit and vegetables from fruit-fly ports also receive careful attention.

CODLING-MOTH.

Our persistent fight against the importation of codling-moth and that which has gained a footing in a few small areas still gives our orchards the reputation of being generally free from infestation. A comparison of the conditions existing south of the International Boundary has called forth some very complimentary remarks from our friends on the other side. Just how long we can retain such a good reputation is very uncertain, but results appear to warrant our efforts of prevention.

Besides inspecting all commercial importations of fruit, extra precautions are taken against infestation by way of tourist and wagon-road traffic entering the Okanagan and Kootenay Districts.

CODLING-MOTH INFESTING WALNUTS.

Recent development of codling-moth larva infesting California walnuts has necessitated extra precaution against such infested nuts entering the Province. Under the circumstances, your Inspector considers he is justified in charging an inspection fee on imported walnuts similar to the amount charged for the inspection of imported peas, beans, or corn, no inspection fee having been charged on walnuts previously. A similar fee is also justifiable for peanuts owing to necessary inspection for *Plodia interpunctella* moth, which causes considerable damage to the nuts in storage.

FUMIGATION OF STORED PRODUCTS.

Considerable quantities of Manchurian corn, rice, beans, and peanuts from Japan, China, and Strait Settlements have been fumigated at Vancouver and Victoria during the year owing to infestation of moth, beetle, and weevil, the tabulated amount of which is included with this report.

The recent and still prevailing shortage and high price of many varieties of stored cereal products has drawn the attention of merchants and dealers to the tremendous loss resulting from insect-infestation, which during a time of plenty and easy prices was very much ignored. Some dealers who formerly objected to the expense of having their corn, peanuts, etc., fumigated at the Government chambers have quite cheerfully submitted their imported shipments during the last year or so. In some cases the consignee has refused to accept his consignment until fumigated.

Special investigation regarding infestation of stored products was started recently by the Dominion Entomological Department and also the Federal United States Department. These circumstances would appear to more than justify the action taken by your Department during the last fifteen years in the matter of compulsory fumigation of infested importations.

Repairs to Vancouver Fumigating Station during the year consisted in reshingling and tarring a large portion of the roof at a cost of $475, some of the shingles having done service for over fifteen years. Repairing and renewing eave-troughs, pipes, and gutters was also included in this work.

QUARANTINE CO-OPERATION.

One of the important incidents during the year was the opportunity given your Inspector to attend the Western Plant Quarantine Conference held at Riverside, California, May 26th to 30th. This was composed of a representative gathering of officers in charge of plant-quarantine

work from the Western States, New Mexico, Hawaiian Islands, and British Columbia. Such a conference was naturally of great benefit to every official there, the principal subjects being regulations and methods of enforcing them, insect pests and diseases prevalent in different parts of the world that should receive our special attention, etc. The Conference completed its sessions by forming the Western Plant Quarantine Board, of which your Inspector has the honour to be the charter member representing British Columbia. The routine procedure of the Board will be carried out in a way to keep all members informed regarding any importation developments relating to quarantine-work.

In order to provide all Quarantine Officers stationed at British Columbia entry-ports with technical information relating to their duties, each one is being supplied with an up-to-date manual of insect pests and diseases affecting orchard, field, and garden products. These manuals, being the property of the Provincial Department of Agriculture, will be retained by the officials while engaged in the quarantine-work and transferred to their successors.

Your Inspector takes great pleasure in expressing his appreciation of the hearty co-operation and faithful service rendered by all the members of his staff, realizing that without their intelligent assistance we could not succeed in guarding the Province against disastrous importations.

Respectfully submitted.

W. H. Lyne,
Inspector of Imported Fruit and Nursery Stock.

SYNOPSIS REPORT OF THE DOMINION ENTOMOLOGICAL BRANCH IN BRITISH COLUMBIA.

R. C. Treherne, Entomologist in Charge.

Peach-twig Borer (Anarsia lineatella).

Studies on the life-history, habits, and control of this insect were carried on again this year, in much the same way as in 1918, at Penticton. Larval activity was pronounced in hibernaculæ on April 9th, but a period of cold, backward weather delayed any larval movement to the buds until the third week of April, or at a time of growth when apricots were approaching full bloom and peaches were showing "pink," but with no blossoms open. In 1918 the same degree of larval movement took place on April 10th, when apricots and peach-blossom buds could only be considered as "well swollen." Larvæ were first found to be infesting terminal buds of peach on April 27th in 1919 and on April 16th in 1918. Peach-trees, however, were in bloom approximately on the same dates, April 25th to 27th, in both years. Larvæ completed their growth and commenced the formation of pupæ on May 28th and moths commenced to emerge on June 16th. Minute larvæ were found again on July 14th in the field, evidently the progeny from moths that made their appearance in the middle of June. These larvæ bred to maturity in confinement in August, thus proving that under laboratory conditions this insect has at least a partial second generation. This data assists in establishing some information on the disputed number of generations of this insect, wherein from one to three generations are claimed by investigators in the Western United States. Hibernaculæ were found in the orchards on August 20th, and it is possible that larvæ forming hibernaculæ at this time were the progeny from late-appearing moths. If this were so the insect is single-brooded. On the other hand, moths were being continually bred to maturity under laboratory arrangements established to approximate natural conditions until late in September, which indicates, at least, that a certain percentage of the larvæ will persevere to maturity in the autumn months.

Control.—We are again satisfied that applications of lime-sulphur 1-9 applied to the trees as close to, but previous to, the blossoming period as possible will achieve good commercial results. Applications of arsenate of lead at 2 lb. to 40 gallons applied to the trees after the fall of the blossoms is offered as a method of control secondary in importance to the earlier lime-sulphur application, but it is suggested as a method of control should the grower find it inconvenient to apply the first spray. Either application individually will present commercial results. The two applications, each made separately, are suggested in cases of severe infestation.

THE PEAR-THRIPS (TÆNIOTHRIPS INCONSEQUENS).

This insect was again the subject of study at Victoria to determine the period of emergence from the soil as a guide to the spraying operations of the fruit-growers. The first adults were taken in soil cages on March 21st, a few days earlier than in previous years. Cool weather retarded the opening of the buds, resulting in the first spray applications being made on March 31st.

FRUIT-WORM STUDIES.

For many years the correct identity of the various fruit-worms and bud-moths infesting Okanagan apple-orchards has been in doubt. Emphasis is laid on the importance of a close study of such insects, for the reasons that severe injury is sometimes caused to the buds and fruit of apple-trees and because of their superficial resemblance to and possible confusion with the larvæ of the codling-moth, an insect which has not as yet become generally established in the Okanagan Valley. Larval feeding and structural characteristics have been studied this year of each of the various "worms" found and notes were taken on their comparative abundance. The following insects have been observed and identified: *Tmetocera (Eucosma) ocellana*, *Argyroploce consanguiniana*, *Cacœcia rosaceana*, *Mineola tricolorella*, and *Laspeyresia prunivora*. There are a few more larvæ that have not as yet been determined. Preliminary notes on the life-history of each of these species have been taken, and it is hoped that further studies will be undertaken during 1920.

An apple-tree bark-beetle (*Magdalis sp.*) caused conspicuous injury to the foliage of the apple-trees in the Vernon District by the feeding activity of the adults. The epidermis on the upper surface of the leaves is devoured and an injury similar to that produced by the larvæ of the pear-slug on pear and cherry leaves is caused. Copulation takes place in early June and females were observed excavating egg-chambers at the base of buds of the previous year's growth.

FIRE-BLIGHT DISTRIBUTERS.

Owing to the anxiety on the part of many fruit-growers in Interior districts over the effects of the fire-blight disease in apple and pear orchards, preliminary studies were undertaken in 1919 to determine what insects were liable to be associated with the spread of the bacillus in the early spring and during the summer. This study was undertaken this year entirely at Vernon, and while the season closed with many negative results it is felt that the work has presented a base upon which to build the inquiry another year. Fortunately the disease was not severe this year owing to the dry season, and many artificial inoculations failed to take. The common insects considered liable to be the means of spreading the disease were enclosed, under field as well as laboratory conditions, with diseased twigs and leaves. Each series was in turn introduced on to normal and healthy growth and allowed to feed under mica chimneys. The following insects were used in the experiments: The apple-leaf hopper (*Empoasca mali*), 11 series; the rose-leaf hopper (*Empoa rosæ*), 25 series; the apple-aphis (*Aphis mali*), 20 series; the tarnished plant-bug (*Lygus pratensis*), 35 series; the pear-slug (*Eriocampoides limacina*), 4 series; the woolly aphis (*Eriosoma lanigera*), 6 series; a pentatomid (*Euschistus variolarius*), 1 series; a leaf-hopper (*Thamnotettix sp.*), 6 series. A great majority of these trials proved entirely negative, but *E. mali*, *A. mali*, and *L. pratensis* have been shown to be blight distributers. So far as early spring distribution is concerned, ants, honey-bees, click-beetles, apple-aphis, and bark-beetles are incriminated. Of the click-beetles, *Cardiophorus fenestratus* was observed commonly on the stumps of pear-trees which had been cut down for blight and was seen to be feeding on blight exudate. *Corymbites fallax* and *Corymbites inflatus* were both observed on apple-trees; the latter species in particular caused considerable damage to young apple-trees by eating out the buds in early spring. *C. inflatus* is to be found in numbers on the blue lupine and is by far the commonest and doubtless the most injurious of the various click-beetles infesting orchards at Vernon.

THE ROSE-LEAF HOPPER (EMPOA ROSÆ).

This insect in our experiments is not as yet incriminated as a blight-carrier, and, so far as can be determined, it has not been shown to be such by other investigators. During 1919 it occurred in extraordinary numbers in many Okanagan apple-orchards, producing the well-known discoloration of the leaves and causing considerable damage, and it may yet prove to be an

important carrier of summer blight. Brief notes were taken on its life-history this year which clearly show that the early spring generations occur on rose-bushes, both cultivated and wild. During June migration takes place to the apple, where nymphs and adults may be seen until September, when the great majority return to the rose for oviposition. As a control it may be seen that proper consideration should be given the pruning, burning, or spraying of rose-bushes. If this is not done, nicotine-sulphate and soap applications should be applied to the under-surface of apple-leaves in July, when the nymphs make their appearance.

Small-fruit Insects.

The Strawberry-root Weevil (Otiorhynchus ovatus).—The investigation into the life-history and control of the strawberry-root weevil on Vancouver Island was continued during the past season. W. Downes, assistant in charge, has carried on extensive control operations in association with the Horticultural Branch of the Provincial Department of Agriculture. A section of land has been engaged for a period of six years to demonstrate crop-rotation and the maintenance of soil-fertility as a control against the weevil. Experiments which promise well have been undertaken to prevent weevil migration in early summer by means of a tanglefoot barrier. Several new and important points in the life-history of this insect have been brought to light by Mr. Downes. Notable among these observations have been the fact that the adults are parthenogenetic and that over-wintering adults deposit eggs in the spring.

The Raspberry-crown Borer (Bembecia marginata).—A commencement was made in the study of this insect on Vancouver Island, and it is hoped that next year further experiments for control and life-history notes will be undertaken. This insect is proving of great importance to growers of raspberries and loganberries in Coast sections.

Other small-fruit insects which received some attention in the Coast districts were the loganberry-leaf hopper (*Empoasca sp.*), which was successfully controlled by a soap and nicotine spray; the raspberry-cane maggot (*Phorbia rubivora*); the strawberry-crown borer (*Aristotelia fragariæ*); *Synanthedon rutilans.*

The Currant Fruit-fly (Epochra canadensis).—This insect is the subject of a great deal of inquiry in Coast and Interior districts. Certain notes on the life-history of these species were taken in the Okanagan Valley during 1919 and an effort was made to test the value of the sodium-arsenate and molasses bait. Flies were abundant at Vernon on May 19th and many eggs were present in the fruit on May 22nd. This was at a period in the growth of red currants when some fruit had commenced to form, but with some blossoms still in evidence. Red currants were in full bloom during the first two weeks of May. Maggots started to leave the fruit for pupation at the end of June, entering the soil to a depth of from 1 to 4 inches. As a result of the work carried on it is not possible as yet to recommend the poison-bait method of control. Growers are recommended to rely on cultivation and the use of chickens for the present until further records can be obtained on the value of sprays.

Vegetable Insects.

The Onion-maggot (Hylemyia antigua).—An extensive experiment with the use of sodium-arsenite and molasses bait (¼ oz. to 1 pint) as a control measure against the onion-maggot was carried on at Vernon this year. Specially constructed cans were made, filled with water, which allowed a certain quantity of water to filter down on to felt pads arranged in trays. The felt pads, having been soaked in the bait and a few ounces of the poisoned liquid poured over them, retained their moisture for four to ten days under all temperatures. Twenty of such bait-cans were placed to the acre between the rows of onions, and 2½ acres in an 8-acre field, in all, were treated in this experiment. The bait-cans were set on May 14th, five days before any eggs were laid in the field, and they were maintained continuously until the end of June, and again during the first two weeks in August. Samples of the poisoned liquid were taken two or three times a week from the trays and fed to flies. The adults were observed to be in distress within five minutes of actual feeding and were completely stupefied in thirty minutes, and this condition prevailed throughout despite frequent dilutions from rain and from the water in the reservoirs above the felt pads. Flies left to their own devices in the laboratory in the presence of crops of poisoned bait gave a 100 per cent. mortality in less than twenty-four hours. Circular fly-traps arranged in the field, each baited with different essential oils and mixtures, undoubtedly showed that molasses was the most suitable substance to attract the flies. Despite these two favourable

circumstances, we are unable to claim that the poisoned-bait method is a satisfactory control under such field conditions as they prevailed at Vernon in 1919. Oviposition took place on seedling onions and on volunteer onions (from the crop of the previous year) in such numbers that it was impossible to state that the poison bait had any effect in checking oviposition. In several instances volunteer onions gave as many as 500 eggs to the plant during May and June. The influence of a suitable type of volunteer onions as a trap-crop for the first generation presents a phase of onion-maggot control that must be regarded very highly. In the 8-acre experiment of 1919 a number of sections of onion-seedling rows were examined daily for egg oviposition, and it may be stated that there was no material difference in oviposition in the baited area or in the non-baited area. Further, there was no indication that the maggot attack was more severe in any one part of the field over any other.

The first male flies appeared in the field on May 10th; the first females a few days later. The height of the oviposition period was not passed until June 6th. Eggs were laid in the field on May 19th and continually from this date until August. The length of the larval period varied from sixteen to twenty-nine days and the pupal period from fourteen to twenty-six days. The earliest pupa formed was found on June 14th. Second-generation adults appeared on July 7th. The first generation of flies extended over a period between May 10th and July 7th; the second generation until August 23rd. Two generations occur and doubtless a third, but the life-history notes on the last generation have not been obtained with accuracy. A great many notes have been obtained on the habits of the fly and particular attention has been paid to temperatures and weather conditions.

The Cabbage-root Maggot (Phorbia brassicæ).—An experiment was conducted at Armstrong on about 1,600 cauliflowers in an effort to control the cabbage-root maggot. The block was divided into twelve sections, where the relative merits of tar-paper disks and treatments with mercury bichloride were compared. Three control, untreated areas were maintained to judge the degree of efficiency. It was clearly shown that, with cauliflowers growing on cold bottom land with an abundance of subsoil moisture, mercury bichloride, in three treatments at 1 to 1,000, was superior to the use of tar-paper disks. Tar-paper disks with this type of crop and soil produced a distinct collar-rot on the plant beneath the disk, causing a direct loss of at least 36 per cent. The loss by maggot attack in the mercury-bichloride blocks at strengths ranging from 1 oz. to 6 gallons of water, 1 oz. to 8, and 1 oz. to 10 was less than 2 per cent., with three treatments. With two treatments at 1 oz. to 6 the loss by maggots was 6 per cent.; at 1 oz. to 8 and 1 oz. to 10 the loss was over 60 per cent. On cabbage the tar-paper disks proved entirely satisfactory, resulting in a loss by maggot attack of not more than 5 per cent.

Cutworms.—No experimental work was conducted this year on cutworm-control. The former recommendation in the use of the poisoned-bran bait applied broadcast in the early spring, before the crops are planted or appear above the ground, is still offered growers as a suitable and economical remedy.

Thanks are due Mr. Speare, Mycoentomologist of the United States Bureau of Entomology, for determining the probable identity of *Entomophthora megaspermum*, a fungus-disease described in 1873 and never having been recorded since to the best of his knowledge. This fungus was found at Keremeos, attacking a noctuid larva associated with the common plant *Chrysothamnus sp.* It is possible that this fungus may prove of economic importance in the control of cutworms.

FORAGE-CROP AND GRAIN INSECTS.

Grasshoppers or Locusts.—The last two years in British Columbia have been dry and conditions have been produced in range and grain areas which are usually considered favourable to grasshopper increase. During 1919 outbreaks have been reported from four widely separated districts—viz., in the Bridesville-Rock Creek area; at Celista, on Shuswap Lake; in the Chilcotin District, 150 miles north of Ashcroft; and in the Huntingdon area of the Fraser River Valley. At Bridesville *Camnula pellucida* was the chief injurious species involved; at Celista it was *Melanoplus atlanis;* in the Chilcotin, *Camnula pellucida;* and in the Fraser Valley, *Melanoplus femur-rubrum.* Each of these areas was visited this year to determine the nature and degree of injury, and, in addition, close watch was kept upon the development of locusts in the Fairview area, south of Penticton, owing to the attention this district will attract within the next few years under the soldiers' land-settlement scheme. About thirty different species of locusts have been taken this year in all the districts mentioned and systematic and ecological

notes have been obtained of many of the species taken. It is felt that the importance of locusts as crop-destroyers will be realized in the future, and it is believed that the work accomplished this year, which was largely in the nature of survey of the entire problem, will serve as a useful base for later investigation. Of the parasites and predaceous insects, forty-six different species of insects were taken in areas associated with locust attack. No efforts were made to determine the correct relationship of these insects with the locusts. The species taken include members of the Asilidæ, Bombyliidæ, Tachinidæ, and Sarcophagidæ. *Epicauta maculata* and the mite *Trombidium locustarum* were also observed present.

Spraying Investigations.

All spraying-work undertaken this year has been carried on by the officers of the Provincial Horticultural Branch at the Coast, in the Interior, and in the Kootenays. These studies involved the control measures used against apple-scab and apple-aphides, with variations in the strengths of lime-sulphur sprays and the use of various different proprietary mixtures.

Other Insects of Note.

The western tussock-moth (*Hemerocampa vetusta* form *gulosa*) was reported at Chase, Armstrong, and Vernon. Where this insect occurred in numbers this year it caused complete defoliation of Douglas-fir trees and western yellow pines; the hairs of the caterpillars producing a pronounced itch and swelling on the human skin.

A pentatomid bug (*Apateticus crocatus*) is reported from Victoria by W. Downes to be of considerable economic importance in destroying the larvæ of the tent-caterpillar and the oak-looper (*Ellopia somniaria*). These bugs were often seen climbing the oak-trees in search of larvæ upon which to feed.

The tent-caterpillars (*Malacosoma pluvialis* and *erosa*) were common in Coast and Island districts. These insects were the subject of a memorandum on control to the City and Municipal Councils in the infested districts. They were also studied by A. B. Baird, of the Dominion Entomological Branch, from the standpoint of natural controlling agencies.

The syrphid fly (*Eumerus strigatus*) has been taken at Vernon and Kelowna. This insect is recorded elsewhere as injurious to onions, but thus far no records have been received which indicate that it is a pest in British Columbia.

The apple fruit-miner (*Marmara pomonella* Busck), which was identified first for British Columbia by A. L. Quaintance, of the United States Bureau of Entomology, in 1917 from apples received from Creston, was again taken this year from Sorrento on October 25th.

The Colorado potato-beetle was reported for the first time in the Province this year from the south-east corner of the Kootenay District. An interesting record was also received from Vancouver, where earwigs, probably *Forficula auricularia*, were reported as a pest in an apartment-house. The codling-moth breeding and life-history records were continued in 1919, as in previous years, from the material brought in by the Provincial Field Inspectors. A report on the codling-moth situation as it existed at the close of the year will doubtless be included in the Annual Report of the Department of Agriculture.

Acknowledgment.

This synopsis report has been written from the entomological records obtained by the officers of both the Provincial and Dominion Departments, Messrs. Ruhmann, Buckell, Venables, and Downes, to whom I acknowledge my indebtedness for their co-operation and assistance.

REPORT OF LIVE STOCK COMMISSIONER.

W. T. McDONALD.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith my annual report for the year ending December 31st, 1919.

GENERAL CONDITIONS.

The scarcity of labour still presents a considerable handicap in the operations of a large number of our farmers. This has been particularly felt in dairy districts and on the larger stock-ranches. It was hoped that shortly after the conclusion of the war this question would be solved, but it is now apparent that many of the men formerly employed on our farms are either turning their attention to other industries for the time being or taking up farms for themselves. It is very evident that the high wages paid in shipyards and other urban industries have had the tendency of drawing men away from agricultural labour, and that it will require time for the readjustment to take place. As a labour-saver the milking-machine has come into more extensive use on dairy-farms, while some dairymen have seen fit to reduce or sell off their herds.

The prices of feedstuffs have shown a tendency to advance. This has had the effect of encouraging co-operative buying, which is now being practised in many districts, and with much benefit to the producer, who hopes in this manner to maintain production on a profitable basis. The conditions referred to have also tended towards greater efforts in the production of substitutes for feedstuffs formerly purchased.

The hay situation in the latter summer and early fall appeared extremely serious owing to the drought which extended over Southern Saskatchewan, Southern Alberta, the Kootenays and Boundary Districts of British Columbia. Early fall rains in the affected areas tended to improve conditions, and before very much buying had been done the situation improved greatly. The removal of the duty on hay from the United States had a decided tendency to lower prices and increase the available supply. The assistance given by the Provincial Government in bearing part of the expense of freight on hay in drought-affected areas enabled the stockmen to retain their breeding animals. In making an inspection of conditions in the East Kootenay during the month of August, I was particularly impressed with the desirability of developing hay meadows in order to supply winter feed. There is sufficient summer range to carry several times the number of cattle now being handled, but at the present time the supply of winter feed is the limiting factor. It is to be hoped that feasible irrigation schemes may be developed for the production of alfalfa and other forage-crops.

It is interesting to note that there is a great interest in the breeding of better live stock, as evidenced by a large number of farmers who are making a beginning in the breeding of pure-bred flocks and herds. This applies to practically all sections of the Province, and has probably been most apparent in the Okanagan Valley, where a considerable number of pure-bred herds of both beef and dairy cattle have recently been established. We also find that along the Grand Trunk Pacific a considerable number of pure-bred females have been introduced. This development is gratifying from several standpoints, but most of all in that it furnishes a source of supply for good pure-bred sires. The need for such sires is probably not fully appreciated. In the most advanced districts the scrub sire is still to be found occasionally, while over large areas the percentage of pure-bred sires is very small. In many cases this condition is due to indifference on the part of live-stock owners, while in many other cases it is due to the impossibility of securing registered animals without shipping them in from some considerable distance. Taking the Province as a whole, we find that only a very small percentage of the pure-bred beef bulls required are produced within the Province, and many stock-raisers feel diffident about purchasing animals which they have not seen and for which they must pay a considerable price. Educational work and personal canvass of the farmers affected will do much to improve the condition, and, while in some cases it may require more than argument to effect a change, still, I do feel that in the past we have underrated the intelligence of our stockmen, and that, as a whole, they would readily respond to any encouragement given them along this line.

HORSES.

The horse-breeding industry has passed through a period of depression brought about by a combination of circumstances. First of all, the cessation of extensive development operations, such as construction-work in cities and on railways, threw a large number of surplus horses on the market, and at the same time motor-trucks, motor-cars, and tractors were being perfected, while the scarcity of labour encouraged the use of the tractor on the theory that one man could take the place of two or more where horses were used. The popularity of motor-power has also been augmented in a very large degree by extensive and aggressive campaigns of advertising on the part of manufacturers. In other words, the horse was being eliminated from competition by advertising. We now find that under many conditions the tractor and motor-truck are proving more expensive in operation than horses, and we are convinced that the horse will resume his place in fields from which he was temporarily driven, and the demand thus created will be augmented by the extensive development of new agricultural areas. Our statistics show a slight decrease in the number of horses in the Province for 1919 as compared with the year 1918, there being 43,717 horses in the Province, as compared with 44,131 for the year 1918. Very few stallions have been brought into the Province during the last two or three years, while our two leading studs of Clydesdale horses have been dispersed.

The present demand is for a heavy horse, which is becoming comparatively scarce owing to the export of this class of animal, and there is no doubt that this type of horse is the one which the market will require in future. To those in a position to do so, the breeding of heavy horses of good quality should prove one of the most profitable branches of the live-stock industry, and we cannot emphasize too much the desirability of securing stallions possessing size.

CATTLE.

The statistics which we have been able to secure show practically the same number of cattle in the Province for 1919 as for 1918, though I am convinced that, were we able to secure accurate statistics for Central British Columbia and the Peace River District, we would find that the increase in beef cattle would more than offset the decrease in dairy cattle in those areas where the labour problem has been serious. Late in the year large numbers of cattle were driven into the Peace River District, the movement of which had originated in Southern Saskatchewan and Southern Alberta. From such information as we have been able to secure, we feel justified in stating that the majority of the men who have taken cattle into the Peace River Block will continue and extend their operations in British Columbia. As in 1918, shipments of cattle have continued to move into that part of the Province tributary to the Grand Trunk Pacific, and particularly from Prince George west to Hazelton. During the year 134 cars of live stock left the Union Stockyards at Edmonton for points in British Columbia, which does not include the extensive shipments made to the end of steel and driven into the Peace River country in this Province. Conditions would indicate that this movement will continue with increasing numbers for some time, as the areas mentioned are essentially mixed-farming districts, in which the produce of the farms will be largely marketed in the form of live stock and live-stock products. Extension-work in these new areas along the line of encouraging more and better live stock will result in much benefit. While many good animals are being taken in at the present time, we find in many cases a lack of appreciation of the value of good sires.

Considerable numbers of grade and pure-bred dairy cattle are going into Central British Columbia, and with the establishment of creameries this feature of the live-stock industry will make rapid progress. The most serious problem which presents itself at present is the source of supply of first-class dairy cattle at reasonable prices. Good dairy cows are selling as high as $250 and over, both in the dairy sections of British Columbia and in the State of Washington. The Prairie Provinces are not in a postion to furnish any considerable number of dairy cattle, and should present conditions maintain it may be found desirable to bring shipments from the dairy districts of the Northern Central States.

Shipments of pure-bred dairy cattle have been made during the past few months to Australia and the Hawaiian Islands, while we are reliably informed that orders from the Orient will soon be placed in this Province. These facts are significant of the appreciation of the merit of the dairy herds of this Province, and no doubt will prove the beginning of a more or less extensive trade.

The situation in regard to bovine tuberculosis continues satisfactory, and it is gratifying to note the aggressive stand being taken by our dairymen in regard to this disease. Results of work already done have served to place our breeders of dairy cattle in an enviable position. We are pleased to note that the Federal Department of Agriculture has adopted a plan of accredited herds for pure-bred dairy cattle, and this is already being taken advantage of by some of our breeders. This will facilitate export trade, particularly to the United States, and altogether lend encouragement to breeders, as well as furnishing a guarantee to prospective purchasers in so far as tuberculosis is concerned.

SHEEP.

The numbers of sheep in the Province have remained fairly constant as compared with last year, though with the administration of the public ranges as contemplated by the Lands Department the numbers will undoubtedly increase. Markets would indicate that the high point in prices has been passed, and during the fall of the year breeding ewes could be purchased for less money than during the two previous years. In the Boundary country some sheepmen are again venturing into the business where a few years ago they felt compelled to abandon it owing to the prevalence of disease attributable to a wood-tick. The prices obtained for wool have been good, and the present world conditions relative to the wool-supply would indicate that good prices may be expected for some time to come. A large portion of the wool produced in the Province was handled by the Interior Wool-growers' Association, and marketed through the Canadian Co-operative Wool-growers' Association, with headquarters in Toronto. In most cases the prices secured were well over 50 cents. per pound, and shippers generally were exceedingly well pleased with the results. The Interior Wool-growers at present contemplate the extension of their operations to include the interior Province, which doubtless would result in benefit to all concerned and strengthen the Canadian Co-operative Wool-growers' Association.

Some sheep are being shipped in along the Grand Trunk Pacific, where they will be handled mainly as a side-issue on the farms, and where they will prove a profitable adjunct.

SWINE.

The numbers of swine in the Province show an increase from 39,805 to 44,960 as compared with 1918. The prices received have been fairly good, but the cost of production in most cases has been very high. We have encouraged cheaper production by the use of pasture crops where such can be utilized. Grain feeds must of necessity remain comparatively high in this Province owing to our dependence on the Prairies for a considerable portion of our supply, and it will be necessary for our farmers to give careful attention to the cost of production in handling this class of live stock.

We have been remarkably free from hog-cholera during the year, and the reduction of bovine tuberculosis in our dairy herds has doubtless resulted in controlling this disease among swine.

Early in the year numerous complaints were made regarding a fishy flavour in pork, and upon investigation we found that this matter had presented itself as a serious problem to one of our large meat-packing companies. Apparently the trouble was due to the feeding of salmon secured during the spawning season, and while we have endeavoured to discourage the use of fish, especially towards the close of the feeding period, we have found it difficult to secure definite information regarding this practice.

GOATS.

The interest in milch goats has made a remarkable growth, and they will doubtless furnish an important source of supply of dairy products in suburban districts. The number of milch goats in the Province is now over 3,500, and the Provincial Goat-breeders' Association now has a membership of approximately 350.

SALES.

Under the auspices of the British Columbia Stock-breeders' Association, a very successful sale of beef cattle (principally bulls) was held in Kamloops on March 25th. Throughout the cattle-grazing districts it has been necessary to import from outside of the Province a very large proportion of the bulls used, and in the past there has been no point in British Columbia where the same could be purchased and no medium of exchange of bulls already in the Province.

Imported Ayrshire bull, "Lessnessock Comet." Owned by Shannon Bros., Cloverdale, B.C.

"Evergreen Maid 2nd," No. 27277. Record, 13,013 lb. milk, 484.58 lb. butter-fat, test 4.04 per cent. Owned by Edwin A. Wells, Sardis, B.C.

Exhibit *re* diet for children, made at the Vancouver Hotel, Vancouver, B.C., by the Domestic Science Branch of the Department of Agriculture at the B.C. Dairymen's Convention.

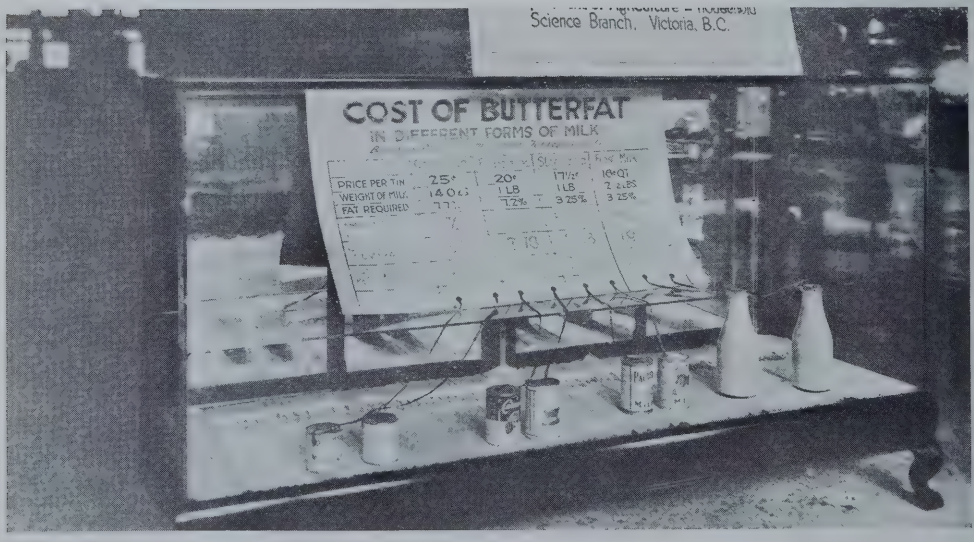

Exhibit made at the Vancouver Hotel, Vancouver, B.C., by the B.C. Dairymen's Association in connection with milk and milk products.

Those who closely watched the sale could not help but be impressed with the stimulus it was giving to live-stock improvement and the encouragement felt by those contemplating the breeding of pure-bred beef cattle. It is the purpose of the British Columbia Stock-breeders' Association to make this sale an annual event, to be permanently located in the City of Kamloops, which is considered the most central point for the beef-cattle industry. The same association held a sale of sheep and swine at Armstrong on September 26th, which also proved very successful. Plans are being made for the holding of sales at other points in the Province, to include, in addition to sheep and swine, dairy cattle.

Purchases for Land Settlement Board.

As in 1918, I was requested to go to Edmonton for the purpose of purchasing cattle and sheep on behalf of the Land Settlement Board for settlers in the Bulkley Valley and the Ootsa Lake District. We were successful in securing good grade cattle at a very reasonable price, and 200 head of sheep were purchased at a figure considerably lower than we anticipated. I have come to the conclusion that the middle of October is about the best time to purchase in the Edmonton yards, but a stranger going there to purchase should plan to spend a few days in the yards in order to acquaint himself with prices and the class of cattle offering before attempting to purchase. A year ago conditions were such, coupled with my lack of knowledge of conditions at Edmonton, that I concluded it was best to place the order in the hands of a buyer in the yards on a commission basis. This year, however, I purchased direct, with very satisfactory results.

The shipments sent into the Bulkley Valley by the Land Settlement Board last year have proven highly satisfactory, and no doubt the recent shipments will prove equally so. I am convinced that the policy of the Land Settlement Board in this connection is to be highly commended. Leaving Edmonton, I went to Brandon, Manitoba, to assist in the selection of some Aberdeen-Angus bulls and heifers for farmers in the Aspen Grove District. Excellent animals were secured, and, as the heifers were choice individuals and bred to excellent bulls, this shipment should prove of great value in the cattle industry of the Aspen Grove District.

Fairs.

I judged at the two large exhibitions in the Province, and also at the Duncan Fair. The display of live stock at Vancouver and Westminster was very commendable, the outstanding feature undoubtedly being the large number of exhibitors of dairy cattle from within the Province, and the improvement made by our local exhibitors in the condition in which their animals were brought into the ring. I also judged the dairy breeds at Edmonton Exhibition, and Percheron and Belgian horses at Regina Exhibition; and during my vacation judged the beef breeds and draught horses at the Washington State Fair. At all of these fairs it was pleasing to observe indications of rapid improvement of Western herds and flocks. At the Edmonton Exhibition the Colony Farm exhibited a herd of Holsteins, which were successful in securing a large proportion of the highest awards.

Kamloops District.

The Kamloops District has been served in a most capable manner by George C. Hay, District Representative of the Live Stock Branch. Mr. Hay has succeeded in securing the confidence and co-operation of the farmers of the district, and has rendered valuable assistance in the organization and administration of co-operative enterprises. I am submitting herewith Mr. Hay's report, which covers in detail the operation of the two dry-farming stations and some variety tests carried on with potatoes.

Silos.

The extension-work carried on by the Department for the purpose of encouraging the use of silos has given excellent results, and this method of providing a cheap, succulent feed is being extended to districts that until recently were not considered suitable. In addition to proving a valuable asset to the dairy-farmer, breeders of beef cattle are now finding silage to be economical and satisfactory in every respect. Many who have built one silo as more or less of an experiment have been so pleased with results as to feel justified in building one or more additional silos. This work has been under the direct charge of R. J. Ferris, and I am attaching his report hereto.

SOIL AND CROP DIVISION.

During 1919 Everett W. Hogan, who had been in charge of the Soil and Crop Division, resigned in order to engage in farming operations in Mexico. His place was taken by William Newton, who had been absent on leave on active service. Mr. Newton has since been granted leave of absence for the purpose of taking up post-graduate work in California in order to better fit himself for the work which he is following.

POULTRY DIVISION.

At the beginning of the year it was decided that the most effective work could be done by moving the headquarters of H. E. Upton, of the Poultry Division, from Victoria to New Westminster, where he has an office in the Court-house. By thus dividing the work between J. R. Terry, Chief Poultry Instructor, and Mr. Upton, a good deal of travelling and expense has been eliminated, and apparently the poultrymen of the Province are obtaining better satisfaction.

I am submitting herewith a complete report from J. R. Terry, Chief Poultry Instructor.

Respectfully submitted.

W. T. McDONALD,
Live Stock Commissioner.

REPORT OF CHIEF VETERINARY INSPECTOR.

DR. A. KNIGHT, V.S.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit the report of the Veterinary staff for the year from January 1st to December 31st, 1919.

During the year, besides attending to the contagious diseases among the live stock, some little time has been devoted to the examination and prescribing for stock in the outlying districts where it was impossible to obtain a veterinarian. The owners of such stock apparently appreciated this movement on the part of the Department.

HÆMORRHAGIC SEPTICÆMIA.

Hæmorrhagic septicæmia has been somewhat more prevalent during the year than in previous years. An outbreak was reported at Hilliers, Alberni, Valdes Island, the Bulkley Valley, and one on the Fraser River. This disease was confined in all cases to young stock under one year of age. As in previous years, the trouble is more prevalent where the stock is allowed access to pasturage on low-lying ground. The onset of this disease is so rapid that we have found treatment of little or no avail. Cattle in contact with diseased animals were advised to be isolated and moved to higher ground. Stables where sick animals were housed were also thoroughly disinfected. The disease did not appear to spread after such precautional measures were taken. The most serious loss from this disease occurred in Valdes Island, where the party lost six well-matured calves.

ACTINOMYCOSIS.

A few cases of actinomycosis were reported during the past year, especially in the Okanagan and Bulkley Valley. In the advanced cases the animals were advised to be destroyed. For the disease when found in the early cases the iodine treatment was advised, apparently with success.

GOITRE.

Goitre amongst swine and other domestic stock is still proving a handicap to stock-raising in some parts of the Province. The iodine treatment, where given a fair trial, I believe is proving effective in relieving this condition. In conversation with several stock-owners in the Pemberton Meadows and Bulkley and the Nechako Valley, I heard that where this remedy has been conscientiously applied good results have followed. In previous years the iodine treatment has been tried more exclusively on sows with good results. The young pigs when farrowed appeared to be in

normal and thrifty condition. A number have tried the same treatment with their mares and cows and report good results, and I believe at present the iodine treatment is being used quite extensively among stock-owners in those districts where goitre is so prevalent. However, this remedy does not get at the seat of the trouble.

INTERNAL PARASITES AFFECTING SHEEP.

Several cases of losses among sheep were reported during the last year. Upon investigation, stomach-worm (*Hæmonchus contortus*) was found to be the cause of the trouble, these worms being found in the fourth stomachs. In all cases these animals were found pasturing on low ground. A change of pasture was recommended and the infected ground to be burnt over or ploughed where possible. The administration of copper sulphate was also found to be quite effective, the dose being for lambs six months to one year 2 oz. of the solution, and mature sheep 2½ to 4 oz.; 2 oz. of the copper sulphate was dissolved in 1 gallon of water as a stock solution and the above dose was given.

PLANT-POISONING.

In the late spring and early summer during this past year a number of cases were investigated of losses among cattle which proved to be due to plant-poisoning, more especially of the water-hemlock. Also a number of specimens were received at the office from the northern sections of this Province. Plant-poisoning has apparently caused considerable loss. In the great majority of cases the water-hemlock was the cause of death. On the opening-up of wider ranges and the advent of more stock in our northern sections plant-poisoning is becoming more prevalent than in the past. It is quite possible that the ranges are being eaten more closely and stock being forced to eat plants which they would otherwise avoid if pasturage were more plentiful. Little can be done unless the stock-owners themselves undertake to fence such areas as are infested with such injurious plants. In one case in the Okanagan a farmer reported losses among his calves. On looking into the case we found the owner was feeding his calves on patented and commercial calf-meal, which had set up gastric trouble and occasioned considerable loss from death of his calves.

TUBERCULOSIS.

During the year 2,068 premises were visited and 14,309 head of cattle tested. Of these, 567 reacted and six clinical cases were found. There has been an active demand for the tuberculin test from parties holding auction sales and individuals wishing to purchase private cows. This feature has been more noticeable during the past year than previously. Intending purchasers of stock are apparently realizing the importance of safeguarding their own private milk-supply and also milk sold. We have endeavoured also to work in conjunction with the milk officers of our cities and have endeavoured to test all cattle within city limits. In Greater Vancouver alone some 670 cows have been tested. Considerable time has been taken up in carrying out this work, as most of the parties have only one or two animals on the premises. While cities have jurisdiction as to sanitary matters within their boundaries, I must say that the sanitary arrangements of some stables within these municipalities are not what they should be, and I deem it is up to the city health authorities to give this matter of sanitation of stables and dairies within their jurisdiction closer attention. In our tuberculosis-work during the past year we have devoted most of our time to those herds where tuberculosis was found on previous tests, and naturally we expected to find a somewhat higher percentage of reactors than if we had applied the test more universally. I deem it essential in the eradication of tuberculosis to clean up those infected herds as rapidly as possible, and during this coming year a good deal of attention should be given to these particular herds where tuberculosis has been found in the past. Now that the Dominion Government is instituting the accredited herd system, the breeders of this Province will no doubt be the first in the field, as I believe the great majority, if not all, of our pure-bred breeders were the first to clean up their herds and have been free of tuberculosis for some time.

I herewith submit the list of the districts in which our men have been working during the past year, together with the number of premises visited in each district, the number of cattle tested, and reactors. (*See* Appendix No. 16.)

The average amount of compensation paid to the owners last year was practically $32 per head.

Sanitation of Stables and Dairies.

On the whole, we find a considerable improvement in the sanitary conditions of the stables and dairies. Inspectors have endeavoured to make this feature of their work as educative as possible to the farmer. The high cost of labour and building materials has prevented in a number of instances any improvement in this line, but I find there is a general tendency of the milk-producer to keep his premises in a cleanly condition. Where at all possible, the owners are replacing their older dairies and stables by better sanitary and modern buildings.

A number of milk-producers during the past year were notified to improve the sanitary condition of their stables, especially in regard to floors and gutters, and also were instructed to install more light and to clean up their premises in general. These instructions were carried out to the satisfaction of the Inspectors.

Respectfully submitted.

A. KNIGHT,
Chief Veterinary Inspector.

REPORT OF CHIEF POULTRY INSTRUCTOR.

J. R. TERRY.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit herewith report for the year 1919.

General Conditions.

During the past year there has been a very large increase in the number of poultry-breeders in the Province. A large majority of these are returned soldiers, most of whom have taken advantage of the assistance towards re-establishment being given by the Soldiers' Land Settlement Board. Owing to the feed restrictions many of the old-established breeders were forced to cut down their flocks to the minimum, and as a result the abnormal demand for hatching-eggs and day-old chicks taxed them to the utmost. As is often the case, some of the less scrupulous breeders went so far as to mate up immature pullets for the purpose of supplying the demand for hatching-eggs.

During the early spring there was a tremendous demand for breeding stock of the more popular varieties. The prices paid approximated those asked in the boom times of 1911. In some few instances it would perhaps have been better if the stock sold for breeding purposes had been marketed the previous fall. Some of the breeding stock sold was undoubtedly older and less virile than good breeding stock ought to be.

Through the year a very large number of geese were raised; in fact, it will be safe to estimate that at least the number of geese in the Province at the end of the year was 100 per cent. more than in the previous year.

Weather Conditions.

During the natural hatching season weather conditions were, on the whole, very favourable to heavy egg production. It was noted that the average egg production during April, May, and June was much higher than during the past few years. The cool spring-like weather in June tended to keep down broodiness among the general-purpose fowls, and also kept up the spring flow of eggs longer than usual. The cool weather, however, was not at all favourable to good chick-growth. In the Coast districts and adjacent islands the abnormal rainfall during the hatching and rearing season proved very disastrous. Coccidiosis was very prevalent in this month. The last time the ravages of this disease were felt was during the spring of 1916, in which year weather conditions closely followed those of the past year. It is safe to estimate that 15 per cent. of the chicks hatched died owing to the scourge.

Price of Feeds.

Beginning with the New Year, the Food Controller threw off the restrictions on wheat-feeding. The regulated price later on was taken off bran and shorts; needless to state, all three

commodities went up in price during the year. As showing the gradual rise of prices since before the war, the table below should be of interest:—

Price of Feeds.

Feed.	2nd Contest, 1913.	3rd Contest, 1914.	4th Contest, 1915.	5th Contest, 1916.	6th Contest, 1917.	7th Contest, 1918.	8th Contest, 1919.
Wheat and corn, 100 lb. ..	$1 75	$1 95	$2 20	$2 15	$2 25	$3 80	$4 10
Dry mash, 100 lb.	1 95	1 97	2 80	2 10	2 33	3 00	3 63
Wet mash, 100 lb.	2 02	1 93	2 80	2 10	2 33	3 00	3 20*
Grit and clam-shell, 100 lb.	1 12	1 08	1 10	1 12	1 30	1 25	1 70
Beef-scraps, 100 lb.	....	4 50	4 50	4 50	4 50	6 10	8 00
Mangels, ton	....	12 00	....	....	12 00	....	....
Straw, bale	70	65	63	50	65	70	85

* Scalded oats.

The above figures were those paid by the Department in connection with the Egg-laying Contest held in Victoria since 1913.

EGG PRICES.

Comparison of Prices (Wholesale) from 1905-19 (inclusive).

	Cents.		Cents.
1905	24½*	1913	35
1906	29½	1914	35
1907	31	1915	32½
1908	31½	1916	34
1909	33¾	1917	41
1910	34¼	1918	50
1911	34¾	1919	60¼
1912	41		

* Figures supplied by ranchers from 1905 to 1911. From 1912 onwards prices are those received for contest eggs.

The number of chicks hatched and reared during the past year will average about 25 per cent. higher than the total of 1918. The experienced breeders have by constant selection, care, and attention been able to show profits sufficient to give them a reasonable labour income. Inter-provincial trade has increased during the year. Each year the poultry-breeders to the east of the Rockies are becoming more conversant with the superior records obtained by our breeders. Throughout the year breeding stock was shipped as far east as Quebec. Inquiries were also received from the Orient, and several valuable pens of utility fowls were shipped to Shanghai.

RABBIT-BREEDING.

The rabbit industry more than held its own in the past year. Many of the returned soldiers taking up land are also going in for rabbits and bees, as well as poultry. The principal breeds of rabbits kept are those of sound utility qualities, such as the Belgian Hares, Flemish Giants, and New Zealand Reds. In addition, quite a few rabbits bearing white or black fur are kept. The high price of furs is making it profitable for this latter class of animal. The breeders of the utility rabbits, however, are still finding it somewhat difficult to get a remunerative price for the pelts. The breeders, members of the Coast Rabbit Associations, are, however, co-operating in this matter, and are now beginning to get reasonably good prices for the skins. During the year the rabbit-breeders staged excellent exhibits at the various Coast exhibitions, and the Island Association held the first rabbit-show in the Province.

DIVISION OF WORK.

Early in the spring Mr. Upton, of this Department, was given charge of the Lower Mainland District, with headquarters at New Westminster. The writer now has the Island and the rest of the Province to take care of. The provision of a motor-car has been of invaluable service in

this respect. Notwithstanding this, however, the Interior of the Province has been neglected owing to the enormous increase in correspondence and visitors to the office in the Department. It has been the custom of the Dominion Soldiers' Re-establishment organizations to pass intending settlers on to this Division. At one period no less than 100 soldiers per month were applying for loans to take up poultry-keeping. The increase of work placed on this Branch can therefore be realized. During the year the writer paid several visits to the new soldiers' settlements in the Province. The settlers showed much interest in the poultry industry and are continually asking for further visits.

FALL FAIRS.

As in former years, the members of this Division have judged poultry and allied exhibits at the fall fairs and exhibitions. The shows this year have exceeded former years in quality in most instances. Additional interest continues to be shown by commercial breeders, many of whom have won prizes at the fall fairs.

LECTURES AND DEMONSTRATIONS.

Whenever possible, lectures and demonstrations have been given to the members of the Farmers' and Women's Institutes, and also the local Poultry Associations.

PROVINCIAL POULTRY ASSOCIATION.

The local associations have without exception taken on a new lease of life during the past year. Many of the associations which were originally formed for the purpose of holding shows primarily are now taking an active interest in co-operative work. The Provincial Poultry Association held its annual convention at Vancouver during the Provincial Poultry-show. The show itself was by far the most successful ever held. A change was made in the management of the show, a secretary-manager being given sole charge of the show in place of the usual show committee. The additional remuneration paid this official has more than justified its expediture. Including pet-stock entries, there were nearly 3,000 exhibits.

The Provincial Association again published its Directory of Breeders. Owing to the unprecedented demand for copies the edition soon ran out. The association again distributed premiums to its members in the shape of egg-record books, packets of poultry-lettuce, and sample tins of egg-preservative. Members of the association who entered in the Egg-laying Contest held in the United States again did well. One of the association members won first prize in the competition held at the Washington State College. His pen of six birds reached the high average of 245 eggs each. During the year the association has co-operated with a newly formed co-operative body, the Poultrymen's Union of British Columbia. The latter body, a joint-stock company, has under wise leadership made vast strides since its organization. The writer was, as per Constitution, appointed Secretary-Treasurer of the Provincial Association.

EGG-LAYING CONTEST.

The Eighth Egg-laying Contest ended September 14th, 1919, being of eleven months' duration. The classes were as follows: Class 1, 21 pens; Class 2, 19 pens.

Owing mainly, in the writer's opinion, to the favourable weather conditions, the Eighth Contest was able to produce nearly 1,000 more eggs than its immediate predecessor. With the exception of two, the contestants were all resident in the Province. No less than eight pens were disqualified, due to the fact that the average weight of one dozen eggs laid was under the stipulated weight allowed—i.e., 24 oz. While, no doubt, it is rather discouraging to a breeder whose pen lays sufficient eggs to place them near the top to have such pen disqualified for laying undersized eggs, yet at the same time, if other winning pens produce eggs above grade, it is only fair to ask the disqualified ones to at least comply with this condition. The Poultrymen's Union of British Columbia mentioned above is very strict in grading its members' eggs. Before long this system of grading will be compulsory throughout the Dominion. The sooner our breeders keep fowls laying normal-sized eggs, the better. The Provincial Poultry Association again provided cash prizes, diplomas, and ribbon badges to winners each month. A report of the contest, together with summary of same, is shown in Appendices Nos. 17 and 18.

BOYS' AND GIRLS' COMPETITIONS.

The competitions this year have again been very successful. There were twenty-two competitions, with a total of 181 contestants. The average quality of the flocks was very high. Owing to the increase of work the writer was unable to judge the up-country competitions. These were, however, handled by the judges sent out by the Department to fall fairs. It might be interesting to record that one (1918) competitor was able through the sale of stock and eggs to purchase a $100 Victory bond last November.

The following are the names of the clubs organized: Beresford, Celista, Creston, Errington, Westholme, Grandview (Vancouver), Langley Fort, Lord Tennyson (Vancouver), New Denver, North Vesuvius, Port Coquitlam, Sidney, Simon Fraser (Vancouver), Sooke, Westbank, Fruitvale, and Fire Valley.

"EGGS MARKS ACT."

The writer, as one of the Inspectors under the Act, made the usual visits to the cold-storage plants in the Province under his supervision. During the year several small shipments of canned Chinese eggs were brought into Victoria and sold to confectioners. Owing to provision not being made in the Act whereby this class of egg could be discriminated against, nothing could be done outside of warning the users of such eggs. It is proposed to remedy this matter shortly by Order in Council. Dominion Orders in Council will shortly be passed regulating shipments of Oriental eggs, and also all other eggs imported from outside the Dominion. When these regulations are brought into being they will strengthen our Provincial "Eggs Marks Act," and thus protect our Provincial poultry-breeders more thoroughly.

PUBLICATIONS.

The monthly reports of the International Egg-laying Contest were sent out during the year as heretofore. Copies were sent to all known poultry journals in Europe, Australia, and America, and also to all Agricultural Colleges, etc. Special articles on poultry topics were supplied to various newspapers in the Province, poultry journals of the Dominion, and also the Department's publication, the *Agricultural Journal.*

INSPECTION AND INSTRUCTION WORK.

As mentioned above, owing to the division of the Province a great deal more work has been put upon the writer. Due to the increased number of breeders, particularly on the Island, the Interior and northern parts of the country have not been visited by the writer this year. At the recent Provincial Poultry Association Convention this matter of neglecting the Upper Country was brought up, and a resolution passed asking for an additional instructor to be provided for the Interior. At the same time assistance was also asked for in the head office. The provision of a stenographer with a knowledge of poultry-keeping would be of inestimable service in the office during the absence of the writer.

POULTRY-DISEASES.

Outside of the serious outbreak of coccidiosis, very few cases of contagious diseases were reported. The usual fall trouble amongst turkeys (black-head) was again present. Would again urge those breeders intending to take up turkey-culture to either refrain, or to be certain at least that they have a sufficient area of land to allow the turkeys absolute freedom for roaming purposes.

OFFICE-WORK.

During the year the following totals of mail were received and delivered by the Poultry Division: Inward letters, 1,926; outward letters, 3,023. The time consumed in dictating about half of these communications could be saved by the employment of office help as outlined in another paragraph. The time saved could be spent in necessary field-work. It is to be hoped that the Dominion Government Land Settlement organizations will provide the necessary Poultry Inspectors to take care of the very large number of soldiers availing themselves of the Government loan.

Artificial Illumination of Poultry Buildings.

During the past year a considerable number of our commercial poultry-breeders have, owing to favourable reports in other sections, provided artificial illumination in the hen-houses during the winter months. In a majority of cases electric light is used, either provided by the electric-lighting companies or by means of the light-producing plants designed especially for farm use. It is customary to light up the buildings from about 4.30 until 7 p.m., and to light them in the morning around about 5 o'clock and leave them burning until daylight. By this means it has been found that the egg production is considerably increased during the winter months.

In the majority of cases, however, the egg yield during the year has not increased, but owing to a larger percentage of the eggs being laid during the high-priced period the lighting system has been found profitable. It has been found inadvisable, however, to make use of this system where the breeding stock is concerned. A heavy winter egg yield from breeders nearly always means a lack of fertility and vitality in the eggs in the spring.

In conclusion, the writer desires to acknowledge the co-operation and assistance given him by W. H. Stroyan, the poultryman in charge of the Egg-laying Contest, who is also an Inspector under the "Eggs Marks Act."

Respectfully submitted.

J. R. Terry,
Chief Poultry Instructor.

REPORT OF DISTRICT POULTRY INSTRUCTOR FOR LOWER MAINLAND.

H. E. Upton.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

Sir.—We beg to submit herewith the annual report of work executed as Instructor of Poultry Husbandry for the district comprising the Lower Mainland on the Poultry Division in this Department of Agriculture, which position was taken over on March 1st, 1919.

Co-operation and Associations.

We again have to report keen interest in co-operative work taken up by various Poultry Associations in the Lower Mainland. Those associations that have been at work along co-operative lines all report great progress.

Bulletins and Circulars.

The bulletin on "Feeding" has been revised and published during the second quarter of this term. A circular was prepared on "Culling," which after being revised was published. We have also written some half-dozen articles for publication in poultry journals and assisted in preparing the prize-list for the local Provincial Exhibition. We have also prepared several charts for the purpose of illustrating lectures which we have delivered at various meetings held during the last quarter.

Our other time spent in the office has been utilized with correspondence in relation to poultry-raising, work on bulletins, handling all disease cases and post-mortem examinations, and other work that comes up daily in connection with our office.

Personal Interviews.

More than the usual number of interviews have been granted from this office, chiefly to returned soldiers wishing to take up poultry-raising, many of whom have been sent to us by the Soldier Settlement Board in Vancouver; but in this we still find it a hardship to give interviews to all persons desiring same owing to the fact that there is no one present to keep the office open at all times, and appointments for interviews have to be given by letter.

Office-work.

Although it has been practically impossible to keep a correct record of all letters received and dispatched, we have record of approximately 600 letters being sent out from this office from

March 1st last. Several long-distance telephone calls, ranging from Chilliwack to and including Vancouver, were made, so that the expense of installing a telephone in this office has not been unwisely spent. We endeavour to be present in this office on each Saturday morning from 9 a.m. to 1 p.m. for personal interviews at all times.

Fall Fair Work.

We officiated as judge at the following fairs: Ioco, Agassiz, Vancouver, Abbotsford, New Westminster, and Duncan. The poultry exhibits in the majority of these fairs were extremely good; in fact, we can state that the exhibits that are staged from year to year gradually improve in quality in the majority of British Columbia fairs.

The poultry exhibit at the New Westminster Exhibition was undoubtedly the best exhibit of poultry that has ever been staged in British Columbia at any of the fall fairs. The Royal Industrial and Agricultural Society, which is the governing body of the New Westminster Fair, also allowed the Poultry Committee to run amateur judging competitions in connection with their exhibition, which created a great amount of interest, some nine classes being staged for competitive work, and there were from six to fifteen competitors in each class. Suitable medals properly engraved and diplomas were given to the winners in each class. Such work is to be highly commended, and the other Fair Associations in the more important poultry districts might take up this work to the advantage of our poultry producers. Over 200 single entries of commercial birds were shown at this fair.

Special comment should also be made in connection with the Cowichan Fair held at Duncan, upon the extremely good quality shown in all classes.

Dressed Poultry and Egg Classes.

The commercial classes in all the fall fairs were of exceptional quality, and we can report that at all fairs and association shows which we have visited this year a marked improvement is being made along these lines. It is hoped that the British Columbia Poultry Association or the Department of Agriculture can some time see their way clear to present or donate a small sum to each group association with which to purchase a glass case, which could be electric-lighted (and refrigerated, if necessary, in warm weather), so that dressed poultry and eggs can be exhibited in prime quality whilst preventing the public from handling the exhibits. Until a method like this is followed the dressed poultry and eggs on exhibition will always be more or less of a loss to the exhibitor after the fair or show is over.

Lectures and Demonstrations.

During the past year we have delivered several lectures with illustrations and otherwise, and have also given a number of demonstrations on culling. (*See* Appendix No. 20.) In this work we have handled some thousands of birds, both adult and young stock.

General Extension-work.

During the past nine months we have been on the road quite extensively, having covered over 10,000 miles in visiting the different people desiring knowledge in connection with poultry matters throughout the district.

Extension and Education Work.

We have endeavoured during the past nine months to impress upon all persons interested in poultry that only proper management of the birds in their flocks would ensure good returns. We have endeavoured to point out the absolute folly of doctoring fowls. We have further tried to educate the ordinary public that even at the present time 200-egg hens are not a commercial success as a whole, and that it is impossible to expect commercial flocks to average such high egg-producing results. So much material is published at this time in connection with marvellous laying strains that the public of British Columbia must be protected in all ways possible.

We have a continual demand on our extension trips for personal visits on personal places. We believe, however, that we will be forced to divide each district up into small groups of six persons in order to cover the territory more thoroughly in answer to personal demands. It is quite impossible to visit each person interested in poultry, and we believe that this is the only way to overcome the difficulty. We would then be able to call upon one of the six persons each

time when visiting said sections and the other five parties to be present at the same time to discuss their problems. Then if any one of the group should need personal attention for some unexplained reason, time could be given to this individual before leaving the district.

DISEASES.

We are pleased to report no disease in epidemic form during this past year. The case of diphtheritic roup which we worked upon the first quarter of our work in this district has been combated successfully. There have been a few mild colds which have called for prompt treatment, which we were fortunate in keeping down to a minimum mortality. There have been a few cases of coccidiosis. Last spring there were some incubation and brooding troubles; but much of this was due to poor management.

Appendix No. 21 shows the various diseases, etc., and the number of flocks affected with such diseases, which we have been called upon to assist in checking during the past nine months.

CONCLUSION.

We are pleased to report that the outlook for the majority of poultry-keepers is quite bright for 1920, although there has been quite a rise in the price of wheat at the time of writing. The poultrymen feel quite certain that conditions will right themselves in the near future. The price of eggs during the latter part of 1919 has certainly not kept time with the cost of foodstuffs.

A great amount of attention will be expected by the returned men who are upon the land engaging in poultry production at this time.

The demand for hatching-eggs and baby chicks has never been so great as for the coming spring, due largely to the above fact. The one big drawback to any one engaging in the poultry business at this time is the exceedingly high price of lumber, which ranges from 100 to 150 per cent. higher than in 1916. During the past year good reports of profitable egg production have been much more general than in the years gone by.

Respectfully submitted.

H. E. UPTON,
District Poultry Instructor.

REPORT OF DISTRICT AGRICULTURIST, KAMLOOPS.

GEO. C. HAY.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report as District Agriculturist for the year 1919.

CANADIAN CO-OPERATIVE WOOL-GROWERS, LIMITED.

A most prosperous year for sheep-raisers and the Canadian Co-operative Wool-growers, Limited, was that of 1918. This was the first year of its operation and exceptionally high prices prevailed. Without the existence of the growers in organized strength it is reasonably contended that the high prices would not have been maintained or realized. The advantages of co-operative unity on the part of the Canadian sheepmen was so decided in 1918 that there was little difficulty for the British Columbia Wool-growers' Association in getting a much larger quantity of wool to handle the following year. In 1918 this association handled 53,806 lb. of wool and in 1919 they handled 98,771 lb. These figures speak for the success of the organization and we have every reason to expect a bigger and better year's business to follow.

Your Agriculturist has represented this Province as director of the Canadian Co-operative Wool-growers, Limited, during the past year and considerable of his time was occupied endeavouring to strengthen the organization.

The development of a home market for more and more of our wools is most helpful. The preparation of a standardized and honest product is meeting with approval and will ensure steady trade in both Canada and the United States. The wholesome character of the business this year cannot help but establish successful progress for the Canadian Co-operative Wool-growers, Limited.

INSTITUTE MEETINGS.

During the past year various institute meetings were arranged and on different occasions addresses were given on agricultural topics. A series of meetings were held early in June in the Okanagan, Nicola, Chilliwack, Duncan, and Kamloops Districts, mostly in connection with the marketing of wool.

FALL FAIRS.

The fairs visited during the past year were Vancouver, New Westminster, Kamloops, Armstrong, and Summerland. At these fairs, with the exception of Vancouver and New Westminster, your Agriculturist assisted the judging of live stock and field products.

BOYS' AND GIRLS' CLUBS.

From time to time an effort was made to keep in touch with the various Boys' and Girls' Clubs and to assist in the judging, etc.

POTATO EXPERIMENT.

An interesting experiment with different varieties of potatoes was carried on in Kamloops, with the following results:—

Potato Experiment conducted in 1919.

Variety.	Measurement of Land occupied by Potatoes.	Date of Planting.	Date of Digging.	Total Weight of Crop.	Marketable Potatoes.	Yield per Acre.	Remarks.
				Lb.	Per Cent.	Tons.	
Reeve's Rose..	Drill 30', 12" apart	May 10..	Oct 2.	42	71.0	8.71	Rather small; no scab or blight.
Wee McGregor	Drill 21', 12" apart	" 9.	Sept. 30.	55	90.9	20.94	Very large; no scab or rot; good.
Carmen No. 1..	Drill 24', 12" apart	" 9.	Oct. 4.	48	72.8	12.70	Nice smooth skin; no scab or rot.
Empire State..	Drill 31', 12" apart	" 9.	Oct. 3.	56	80.3	12.72	Good appearance; smooth skin; no scab or rot.
Eureka.	Drill 23', 12" apart	" 10.	Sept. 29.	68	87.9	22.91	Large; smooth skin; no scab or rot; good.
Early Ohio....	Drill 26', 12" apart	" 10.	Oct. 3.	30	66.6	6.70	Fair; no scab or rot.

BRITISH COLUMBIA STOCK-BREEDERS' ASSOCIATION SALES.

A very successful bull-sale was held in Kamloops on March 26th. The animals brought good prices and the sellers and buyers appeared to be well satisfied. It is believed that the bull-sale will be an annual event. A statement of the first annual sale follows herewith. (*See* Appendix No. 22.)

A very successful sale of sheep and hogs was also conducted at Armstrong on September 26th. For a statement of this sale *see* Appendix No. 23.

OFFICE.

The above lines of work, together with the supervision of the Quilchena Dry-farming Station and frequent inquiries for information at the office in Kamloops, has kept your Agriculturist especially busy during the past year. The local farmers and those interested in the work of the Department of Agriculture have been patronizing the agricultural office with an increasing interest in the work, and the furthering of the agricultural interests in this district by the Department of Agriculture is greatly appreciated by all concerned.

QUILCHENA DRY-FARMING STATION.

The Quilchena Dry Farm has been managed since May 12th, 1919, by Clarence Phelps, who has been working under adverse circumstances to make a success of the place. He has had a good year and accomplished considerable, as can be seen from his report, which follows:—

"SIR,—I beg to submit the following statement of work done on Quilchena Dry Farm since May 12th, 1919:—

"Built corral around dipping-vat and repairing vat. Hauled out and scattered seventy-five loads of manure over fields. Broke 8 acres of sod and took stones off same. Took down and built half a mile of fence. Summer-fallowed 30 acres and picked rocks off same. Cut and stacked 15 acres of grain-hay, also 4 tons mixed hay; estimated yield, 30 tons. Bound and stacked 42 acres of grain, which yielded about 15 tons of threshed grain—7 acres wheat, 7 acres barley, 23 acres oats, 2½ acres fall rye, and 2½ acres fall wheat; estimated at 15 bushels per acre. Prepared ground and seeded 10 acres fall wheat and 10 acres fall rye. Planted and took up ¼ acre turnips, which yielded 8 tons. Planted ⅛ acre of potatoes; yield, 1 ton. Raised 300 lb. cabbage, but owing to dry weather and frosts every month other garden-truck not very good. Cut and peeled 100 fence-posts. Built sheep-corral containing 250 square rods. Built 130 feet of stationary feed-rack and trough for sheep. Built sheep-shed, 20 x 20 feet, of rough lumber. Built root-house, 12 x 24 feet.

"I believe this includes all the important work. Of course, there is other ranch-work too numerous to mention, such as getting wood, looking after stock, repairing fences, buildings, etc.

"Respectfully submitted.

"CLARENCE PHELPS."

(*See* Appendix No. 24.)

105-MILE DRY-FARMING STATION.

The 105-Mile Dry-farming Station has been under the managership of J. W. McKinley during the past year, and his report follows, which shows the work done on this farm for the year 1919:—

"SIR,—I wish to submit the following crop and work report for year 1919 on 105-Mile Dry-farming Station:—

"Summer-fallowed 28 acres stubble and cleared and summer-fallowed 2 acres forest. Cleared (not stumped) 4 acres forest made up of points of forest that projected into the cultivated fields, making their boundaries irregular. Built 540 yards Russell fence 6 feet high and 600 yards stake and rider fence 6½ feet high; this is the Virginia lock pattern and has a rock under each corner to prevent rotting. Built one stack-yard containing 9,000 square feet; this makes three stack-yards situated so that all grain may be stacked without long haulage. These yards have stack-floors made of poles on mud-sills, leaving an air-space under all stacks. Cleared and graded a road from the Cariboo Road to the rear of the farm, making it possible to reach all fields with our largest implements without driving through crops or cultivated land. The fence-posts set by my predecessor are pine, many of which have rotted off. I have replaced these with peeled fir.

"Grain threshed, season 1919: Fall rye, 1,291 lb., yield per acre 23 bushels 3 lb.; fall wheat, 750 lb., yield per acre 14 bushels 17 lb.; Prelude wheat, 976 lb., yield per acre 8 bushels 8 lb.; Huron wheat, 3,155 lb., yield per acre 6 bushels 44 lb. and 5 bushels 25 lb.; Garton oats, 6,440 lb., yield per acre 12 bushels. None of the spring grain is fit for seed. We require a full line of new seed for next season. White hull-less barley and tame hay again a failure. Seed-oats did not arrive here early enough; hence were frozen before ripening, making them very light.

"I broke up 6 acres timothy after haying, making 36 acres ready for crop. Our west field is very low and surrounded by forest; this field has been subject to summer frosts. I have slashed an opening through the timber in a north-east direction to the end of Pasture Lake. I am now slashing on the opposite side to Watson Lake; this will cause a draught through this field and lessen the danger from frost.

"Respectfully submitted.

"J. W. MCKINLEY,
Farm Manager."

(*See* Appendix No. 25.)

REPORT OF SILO DEMONSTRATOR.

R. J. FERRIS.

W. T. McDonald, Esq.,
Live Stock Commissioner, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my annual report for the year 1919.

During the year 1919 there has been a large number of silos built in British Columbia. When this work was first started the aim of the Silo Branch was to place silos in all the farming districts of the Province. By continued efforts this is now practically an accomplished fact. Three silos were built in the Bulkley Valley and because of the practical benefit received by the farmers upon whose farms they were built a large number will be erected in 1920.

Two filling demonstrations were held at Crawford Bay, on the Kootenay Lake, and a building and filling demonstration at Harrop. The silo is a familiar object along the borders of our rivers and large inland lakes. Its use is resulting in a large number of our fruit-farmers adopting dairying as a side-line, and also gives them a means of providing fertilization for the soil.

Altogether ten silos were built under the Department of Agriculture's supervision during the past year and five filling demonstrations held. An increasing amount of correspondence was received at the office. The outstanding feature respecting silo-construction in British Columbia is that large numbers of farmers are building a second silo to keep company with the first one.

During the year 1920 circumstances point to a shortage of dairy feed for this Province. There always is the possibility of an abnormal crop, but this, like a lot of other things which bear upon the cost of production around the farm, is problematical. The aim and object of British Columbia farmers could well be an attempt to eliminate as far as possible the feed bill by production on their individual farms. The silo, if intelligently used, will be a big feature in bringing this healthy condition to British Columbia.

Respectfully submitted.

R. J. FERRIS,
Silo Demonstrator.

REPORT OF DAIRY COMMISSIONER.

H. RIVE.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit herewith my report as Dairy Commissioner for the year 1919.

I resumed work on July 14th, 1919, with the Department of Agriculture, from which I had been absent since January, 1916.

GENERAL CONDITIONS.

The weather conditions during the summer were none too favourable for the industry. A cold backward spring with a cool early summer, followed later by a prolonged drought towards fall, seriously influenced the yield of dairy feeds in many parts of the Province. The Coast districts particularly were lucky in securing heavy hay and forage crops, but roots and corn in general suffered.

Prices of dairy feeds have remained high throughout, with upward tendencies, and nothing that can be done to stimulate the growing of cheap and bulky milk-producing foods should be neglected, for the dairy-farmer will undoubtedly have to rely on these more and more for economical production as prices of by-products advance.

Returned men have been of considerable assistance during the year to dairy-farmers, whose labour troubles have lessened proportionately.

Dairy stock is urgently needed in many of the newer districts now developing. The older districts are quite unable to supply the demand, and the progress of the industry will be hampered to a great degree unless some means of introducing some thousands of animals during the next five years can be devised.

Prices of dairy products have been uniformly high, due no doubt to the necessary exports to Europe. Butter shows no signs of weakening in price. The price of cheese appears rather less stable. The result of the co-operative efforts of the dairy-farmers of British Columbia has been to hold down the price of fresh milk to consumers.

COW-TESTING ASSOCIATIONS—MILK RECORD WORK.

The work of these associations has been good, but has not been properly appreciated by their own members. The number of cows tested is not as great as it should be, and a slackness on the part of local officials has prevented these institutions from becoming, as they might, live centres of progress.

Four associations have been in existence for several years. Two were started during the year. It is expected that two more will be instituted in the Interior next spring.

A list of associations in the Province is appended. (*See* Appendix No. 26.) The Department continues its liberal policy of contributing $50 per month towards each Supervisor's salary, besides equipping each association at its inception. The associations are considering, at the request of the Department, the raising of their annual tax per cow from $1 to $1.50 in order to provide sufficient salary to employ and retain good men as Supervisors. The institution of a record of production to round off and stimulate this work is also under way.

At a meeting in Vancouver on January 20th, 1920, it was recommended that a permanent record, based on production alone, be established for two-year-old heifers giving 300 lb. of butter-fat in 300 days and for mature animals giving 450 lb. in the same period.

With two new associations in operation by next summer, making a total of eight, it is highly desirable that closer supervision be maintained by this Department in order that uniformity of work on the part of testers be brought about, and that members may be helped to avail themselves of the information placed at their disposal.

It is respectfully recommended that an assistant be secured by this Branch, if only temporarily, for work chiefly with this valuable feature of our dairy economy.

Testers under the official rules of the Holstein Friesian Association were supplied. This phase of testing-work finds less favour with breeders than formerly as the value of sustained tests over seven and thirty-one days becomes more established. Several long tests have, however, been carried out in this Province under these regulations.

The following is quoted from the report of T. A. F. Wiancko, Provincial Dairy Instructor:—

"Testers for Holstein Friesian Record of Merit work were furnished for testing at the Colony Farm, and such testing was also carried on at the Dominion Experimental Farm at Agassiz. Some very creditable records were made by British Columbia cows.

"'Zarilda Clothilde III. De Kol,' owned by the Colony Farm, completed a year's work with 33,153.6 lb. of milk, containing 1,194.17 lb. of butter, carrying a calf during 200 days of the test.

"This record stands second only to that of 'Tilly Alcartra,' and is the largest milk record ever made in Canada. She is likewise the only cow, except 'Tilly Alcartra,' to make two-year records above 30,000 lb., or three averaging over 31,000 lb. each, as is shown by the following table:—

Age.	Butter-fat, Lb.	Milk, Lb.
Five years	782.8	29,826.0
Six "	857.0	30,467.3
Eight "	955.3	33,153.6
Average	865.0	31,148.9 "

CREAMERIES.

The report of the Provincial Dairy Instructor under this heading is here given:—

"As much attention as time would allow was devoted to creamery and dairy inspection and instruction, and all creameries received one or more visits during the year.

"A new creamery was established at Vernon in April, when the greater portion of the plant of the Lumby Creamery, which was operated at Lumby some years ago, was removed and put into shape for operation at Vernon. From reports to hand some 47,000 lb. of butter was manufactured from April to December, and about $24,000 was paid to patrons for cream

supplied. This is an exceedingly good start and would indicate that this district will increase very rapidly in dairy production.

"At the Comox Creamery, Courtenay, mechanical refrigeration was installed, together with a well-equipped plant for the manufacture of ice-cream. New pasteurizing equipment has been installed also in several of the creameries in order to further ensure keeping quality in the butter manufactured.

"Sanitary conditions in the creameries and dairies continue to show improvement in general, showing that the owners and operators are striving to put out a better quality of dairy products.

"Continued improvement in the quality of British Columbia creamery butter has been noted, due largely to the keener interest that butter-makers are taking in their work. Improved methods of pasteurizing, with more careful handling and selection of the cream at many of the creameries, has resulted in great improvement in the keeping qualities of the butter.

"A list of active creameries, condenseries, and cheese-factories of the Province is given herewith." (*See* Appendix No. 28.)

DOMINION EDUCATIONAL BUTTER-SCORING CONTEST.

"On the invitation of J. A. Ruddick, Dominion Dairy and Cold Storage Commissioner, three British Columbia creameries participated in the Dominion Educational Butter-scoring Contest, and supplied a 14-lb. box of butter each monthly for six months, May to October, inclusive.

"These were sent to cold storage at Montreal along with the monthly samples from the other Provinces, to be scored and rescored monthly for the purpose of comparison, so that uniform Canadian standards might be fixed and that uniform manufacturing methods might be established throughout the Dominion.

"Dairy officials from the different Provinces were invited to visit Montreal at different times for the purpose of being present while the scoring of the samples was being carried out.

"Your Dairy Instructor was given the privilege of being present at the October scoring, and the information secured, it is hoped, will be of much value in the carrying-on of work in connection with the improvement of quality in butter in this Province."

CHEESE-MAKING.

The past few years have seen a revival of cheese-making in British Columbia, prices previously for many years having been such that local manufacturers were unable to compete with Eastern Canada. The market has not been exacting and a profitable business has been done.

A list of cheese-manufacturers is appended:—

Name.	Place.	Variety.
Fraser Valley Association	Clayburn	Cheddar.
Fraser Valley Association	Sardis	„
Revelstoke Creamery	Revelstoke	„
Ferrara Co.	Chilliwack	Fancy varieties.
Dominion Experimental Farm	Agassiz	„

In addition to these, several dealers are offering cream cheese which they put up, and a number of farmers are finding good sale for farm-made cheese of the softer kinds.

The manufacture of cottage cheese is not receiving the attention it should on farms in this Province.

DAIRY LEGISLATION.

An effort has been made to consolidate the existing dairy legislation, and accordingly a new "Creameries and Dairies Regulation Act" has been prepared, embodying the principles of the old "Dairies Regulation Act" with amendments, and doing away with the "Milk Fraud Act" and Part VI. of the "Agricultural Associations Act" relating to inspection-work.

OPERATION OF THE "DAIRIES REGULATION ACT" DURING 1919.

Testers' Licences.—Fifteen candidates were examined by the Dairy Branch and sixty-five licences were issued. List of testers holding licences appended.

Creamery and Dairy Licences.—To fifty persons or firms buying milk and cream on the butter-fat basis licences for businesses were issued. List of dairies or creameries licensed appended.

Official Testers under "Dairies Regulation Act."—Appointed under the above Act, the Branch has at Sardis and at Vancouver an official stationed. Extracts from their reports giving details of their duties are herewith appended:—

"VANCOUVER, January 13th, 1920.

"From January 1st to December 31st the milk-tester has been engaged in the work of making regular tests of milk shipped by the farmers to the various dairies of the city and to the condenser at Ladner. Each month approximately 800 composite samples are tested for butter-fat, and the test accepted as the basis of settlement by the seller and by the buyer.

"In addition to this specifically timed and stated work, your official milk-tester attends to the correspondence arising out of the tests, and also to the work and correspondence attending a request from any farmer or dairy whatsoever for a check-test from the milk shipments as they arrive, either at the different stations or at the dairies. It is usual to make several tests before reporting on the same.

"In addition to the tests for butter-fat, an effort is being made to encourage more care in the shipping of the milk, by making use of the filter and filter-pads supplied by the Department to demonstrate the amount of sediment which a pint of improperly handled milk contains.

"A demonstration of this usually results in a marked improvement. Use is also made of the acid test to demonstrate the value of cooling in order to ensure delivery to the city in good condition. Altogether not less than 10,000 samples of milk have been tested during the last year.

"E. RIVE."

"SOUTH SUMAS, January 1st, 1920.

"With the exception of the first month of January, your tester spent his time at the Borden Co., Ltd., Factory at South Sumas. At the request of the manager of the Fraser Valley Milk Producers' Association, that month was occupied taking samples and testing at the Chilliwack Creamery. The number of shippers to the creamery was 228 of milk and twenty-two of cream, while at the condensery (Borden's) there were 250 shippers of milk only. During the month of January the taking of samples at the condensery was under the supervision of your tester, who did the testing thereof.

"Each month it has been the practice to note all marked variations and to make a check-test of the fresh milk, which information was carefully indicated on the regular test-slips sent out twice monthly like sample attached. Although no retests were demanded, there were on an average twenty made each month just for the satisfaction of all concerned. Several requests, however, were received for check-tests, and information in explanation of the variations in tests, and these were always promptly responded to. The result of this plan has been very successful in reducing to a minimum the complaints to the factory.

"By way of assisting the dairymen to a better understanding of their problems in proper feeding and care of their herds, sanitary handling of their milk, and particularly the variations in the test of milk and cream, W. K. McLeod, manager of the Chilliwack Creamery, jointly with your tester, held dairymen meetings during the winter months at Rosedale, East Chilliwack, Sardis, Atchelitz, and Fairfield Island. There were approximately 200 farmers present at these meetings, who evinced lively interest in the subjects discussed.

"It can be stated that the work of Government testing has, as a whole, proven entirely satisfactory not only to the buyer, but to the dairymen, by having eliminated the elements of suspicion and mistrust that the farmers have heretofore felt that they were not realizing the fairest results under the old plan.

"J. B. WATSON."

BRITISH COLUMBIA DAIRYMEN'S ASSOCIATION.

The affairs of this association have naturally taken up a considerable part of the time of the members of this Branch. Competitions of various kinds are still carried out by the association and refunds are granted to members on transportation charges on pure-bred dairy stock within the Province. In addition to the annual convention in winter, summer meetings are held at different points in the Province.

FALL FAIRS.

Assistance in judging was given, as usual, at a number of fall fairs, and at some milk tests and competitions were conducted.

New Creameries.

Estimates for two creameries to be started by the Department this spring in the Northern Interior have been prepared by this Branch.

Many districts are inquiring as to the assistance given by the Department in the institution of creameries and purchase of dairy stock.

Respectfully submitted.

Henry Rive,
Dairy Commissioner.

REPORT OF PUBLICATIONS BRANCH.

R. J. Ferris.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit the following annual report for 1919:—

An important feature of the work of this Branch during the past year was the large individual demand made upon the Department for farming literature. The number of individual applications to the Publications Branch amounted to 4,640, and there were sent out during the year 184,480 bulletins and circulars. Comparing this number with the 1918 figures, which were 50,000, shows an increase of more than 270 per cent. Such a large increase as hereby shown may leave the impression of a wastage of material. This is not the case.

By co-operation with the Dominion Soldier Settlement Board we have been able to place reliable information before the returned soldiers who have been taking to farming as a means of livelihood.

The offices which are in charge of the various members of the Provincial Agricultural staff throughout the Province keep a large supply of bulletins and circulars on hand for distribution. Supplies have been forwarded to the Prairie Markets Commissioner, Calgary, and the Agent-General's office for British Columbia in London, England.

The large numbers of returned soldiers who are taking up short-course studies in agriculture at the British Columbia University and elsewhere also rely mainly upon the Department of Agriculture for bulletins.

A pleasing feature of the distribution of the Department's agricultural literature is that the teachers in the city and country schools throughout the Province, after personal application, have been provided with bulletins to aid them in giving the school-children a knowledge of agriculture. By so doing these teachers will take one of the foremost places in laying a true foundation to the agricultural development of British Columbia.

The Agricultural Journal.

The circulation of this *Journal* has increased from 6,000 to 8,500 monthly. From the general tone of resolutions passed at farming conferences in various parts of the Province, it is helping to cultivate a spirit of united effort among farmers in those things which are vital to the proper growth of the agricultural industry.

Respectfully submitted.

R. J. Ferris,
Editor of Agricultural Journal and Chief of Publications.

REPORT OF STATISTICS BRANCH.

G. H. Stewart.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit herewith the annual report of the Statistics Branch for the year 1919.

Scope.

For the first three months of the year the work of this Branch was carried on by A. B. Tweddle, who resigned on March 31st last. Most of this time was spent in securing data and preparing statements for the 1918 Statistics Bulletin. Owing to no appointment being made of a Statistician for the Department of Agriculture, the work in connection with this Branch was held in abeyance until the position was filled by your present Statistician on July 1st last.

The duties of this Branch during the past six months consisted of the collection of data relating to agricultural products, imports and exports. In obtaining figures relating to crop areas and numbers of live stock, the same procedure was followed as for the years 1917 and 1918. In co-operation with the Dominion Bureau of Statistics, card schedules were distributed to all farmers in this Province, the names of farmers being abstracted from the records of the Canada Registration Board's census as of date June 22nd, 1918, together with additional names of farmers who have gone on the land since that date. Data relating to imports from other Provinces in Canada are collected by means of returns sent to this office from the distributers of agricultural food products in this Province. The results obtained this year have been most satisfactory; up to date 90 per cent. of the returns dispatched have been filled out and returned to this office, which gives great promise for the future. Data relating to foreign imports are obtained from the Dominion Bureau of Statistics, Ottawa.

POSTAL CENSUS, 1919.

The total number of cards mailed to individual farmers was 15,146; compiled, 7,970. The following were returned blank, etc.:—

"Removed" or "gone away"	192
Returned by recipients "not farming"	269
Returned noted "dead"	39
Duplicate returns	8
Not called for at post-office	396
Returned by post-office, no notation or "unknown"	499
Total	1,403

The estimated number of actual farmers is 13,743 after deducting the 1,403 cards returned by the post-offices. The total number compiled would be 58 per cent. of the estimated total farmers, to which was added 42 per cent. of the latter total.

It is gratifying to note the increased returns received from the individual farmers over those for the year 1918; the percentage of returns received last year being 42.5 per cent. of the total number of actual farmers, while for the year 1919 the returns received were 58 per cent. of the total estimated farmers in the Province.

It appears from the returns received that the farmers of this Province are beginning to realize the importance of rendering full and accurate returns to this office, and I think that it is only a matter of a short time until this work will bear the desired results in the Province of British Columbia.

It is worthy of note that the Province of British Columbia takes first place above all the other Provinces in the Dominion as regards the total number of returns received, as the following figures extracted from the Monthly Bulletin of Agricultural Statistics for November, 1919, published by the Dominion Bureau of Statistics, Ottawa, will show:—

Province.	Number of Farms, 1919.	Number of Returns.			Percentage of Returns.		
		1917.	1918.	1919.	1917.	1918.	1919.
Prince Edward Island	13,705	.....	7,766	3,770	..	54	27
Nova Scotia	53,634	.....	20,868	12,136	..	38	24
New Brunswick	37,204	.....	13,937	6,643	..	36	17
Quebec	143,958	28,133	34,894	24,735	21	20	17
Ontario	184,337	.....	79,968	36,213	..	43	19
Manitoba	49,855	.....	17,808	10,536	..	38	21
Saskatchewan	103,912	35,592	46,089	35,531	34	44	34
Alberta	67,603	14,444	13,574	4,919	21	20	7
British Columbia	13,743	6,886	6,534	7,970	46	42.5	58
Totals	667,951	.....	241,438	142,453	..	36	21.5

CROP CORRESPONDENTS.

During the month of July the voluntary services of ninety-eight reliable farmers in different parts of the Province were secured to act as crop correspondents. Their duties consisted chiefly

of reporting on crop conditions, climatic conditions as affecting crops, etc., from the beginning of July until the end of December. Of this number, sixty-one of the correspondents reported regularly each month, while the remaining thirty-seven reported about every second month. In addition to the correspondents reporting to this Branch, ninety-three were appointed by the Dominion Bureau of Statistics, Ottawa. At the beginning of each month the two offices exchanged figures and agreed upon averages; by this agreement the result of having conflicting figures was eliminated, at the same time assuring a greater degree of accuracy.

Farm Accounting.

During the past year numerous requests have been received by this Branch for some simple method of farm accounting, and with this purpose in view your Statistician has designed a book which is now before the Deputy Minister for his perusal. The time has arrived when the farmer, in keeping with the methods of men engaged in other pursuits, must keep an accurate and up-to-date record of all his business methods, and it is to be hoped that this book will meet with approval and be published.

General.

Since taking over the duties of this Branch on July 1st last, the total number of letters received was 620, while the total number of letters dispatched was 525. As no record of outgoing and inward correspondence was kept previous to that date, I am unable to give figures for the first six months of the year. Owing to the large increase in the correspondence of this Branch it was necessary to install a new filing system, which took up considerable time. The system adopted was that of an alphabetical index, together with a subject-index system. During the past year sixteen circular letters were sent out to crop correspondents, manufacturers of dairy products, and Farmers' Institutes, etc., comprising in all 2,385 letters. Of the 1,000 copies of Bulletin No. 82, "Agricultural Statistics, 1918," 980 copies have been dispatched. With the compilation of the results of the 1918 postal census, the monthly returns received from crop correspondents, together with other routine matters, the entire time of your Statistician has been taken up.

All of which is respectfully submitted.

G. H. Stewart,
Statistician.

REPORT OF EXHIBITION-WORK.

A. H. Shotbolt.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit my annual report on the above work for the year 1919.

It was decided by the Department of Agriculture to take advantage of the offer made by the Department of Natural Resources, Canadian National Railway Company, to join them in a Provincial display to be staged in their pavilion at the Canadian National Exhibition, held in Toronto from August 25th to September 6th, 1919. Fully three-quarters of the floor-space was given to the British Columbia exhibit. A large and well-arranged display of fruit, vegetables, and general farm products, also minerals, fisheries, Indian curios, and game, attracted great attention.

The transparencies of our British Columbia fruit valleys made good advertising for this important industry. Five thousand copies of the "Handbook of British Columbia" and 2,000 copies of the mineral reports were placed for general distribution. There was also great demand for pamphlets on game and fisheries.

I feel convinced that our grains and grasses could be kept in better condition and shown to better advantage in cases; also that some small transparencies of views of British Columbia would be a great attraction. We were also greatly handicapped by the shortage of fresh fruits, which undoubtedly would have accomplished a great deal of good by advertising British Columbia fruits in the Eastern markets.

One million and seventy-nine thousand visitors passed through the turnstiles, Labour Day having the greatest single-day attendance, there being 189,500 visitors on that day. I would like to express my appreciation of the valuable assistance rendered us by C. Price Green, Publicity Agent of the Canadian National Railway Company, who showed the greatest interest in our combined exhibit. His company very kindly carried our exhibits free of charge.

An exhibit was staged at Vancouver from September 8th to 13th, but owing to the late arrival of the main exhibit from Toronto the display was not as extensive as it might have been.

The Victoria Home Products Fair was held in the Hudson's Bay Company's building from September 22nd to 27th and proved a great success. The attendance was large and interest kept up until the closing day. The display consisted of fruit and vegetables. Sixty-four boxes of choice apples of different varieties were shown, also a great variety of home vegetables.

Miss Hayes, of the Domestic Science Branch, staged a display on food values which was both instructive and attractive. A great number of agricultural bulletins were distributed and were in great demand.

The Provincial Exhibition, New Westminster, was opened by H.R.H. the Prince of Wales on September 29th and closed on October 4th. This was the first exhibition in New Westminster since 1913 and was one of the finest ever staged there. The weather was not favourable, but the attendance was large. A large portion of the Toronto exhibit was staged there. The Domestic Science Branch was also represented.

The British Columbia Dairymen's Association Convention was held in Vancouver at the Vancouver Hotel from January 21st to 26th, at which an exhibit was displayed to show the food value of milk. This proved a great attraction and was well patronized by both grown-ups and children.

Respectfully submitted.

A. H. SHOTBOLT.

REPORT OF COAST MARKETS COMMISSIONER AND INSPECTOR IN CHARGE OF EXPORTS.

R. C. ABBOTT.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I herewith beg to submit to you my annual report for the year 1919.

OFFICE-WORK.

During the year 1919 our office-work has steadily increased. Producers throughout British Columbia are rapidly coming to realize the great benefit they can derive from keeping themselves posted "to the minute" on market conditions and prevailing prices. Since the middle of last June we have been running short-handed, expecting that the work would drop off to some extent, but it has increased and we will require additional help next year.

Our office-work includes the regular correspondence work and filing, export certificate work and filing, general report work, weekly market letter work, general information in all lines of marketing, distribution of Department publications, general information on fruit and vegetable canning, etc.

During the year more than 4,000 people have visited our office.

WEEKLY MARKET LETTERS.

The first letter of the 1919 series was issued on June 28th and continued each week. Owing to many requests from producers for this letter we propose to continue it at least semi-monthly through the early spring. Our mailing-list is now well over the 2,000 mark.

We have received many requests during the season asking us to extend the scope of our report. In making up this weekly letter great care is taken to publish only reliable information in as condensed a form as practicable, and to make what recommendations we feel fit and proper to benefit our producers. With an increased office staff next season, we hope to make this weekly letter still more interesting and beneficial to producers, shippers, and dealers.

Department Publications.

The distribution of Department bulletins from this office is greatly appreciated by the public. During 1919 over 10,000 bulletins and circulars pertaining to agriculture, horticulture, apiculture, and canning have been handed out and mailed. These go into the hands of those directly interested.

From the great number of inquiries we have for information relating to small fruits, we are of the opinion that a series of circulars dealing with the planting and growing of all the various kinds of small fruits would be well received by the public.

There is also a big demand for information in apiculture, and we believe it quite possible that much benefit would be derived by the public if the Vancouver District Bee Inspector would make our office his headquarters.

Marketing.

Since the inauguration of this office there has been a great change for the better in the marketing of farm produce in this city. The writer, personally, looks into any complaints, assists in distribution, the adjusting of claims, and marketing information.

Each year since 1914 has seen a large decrease in wastage, and this factor alone means much to the producer and dealer. A great deal of attention is given to the proper storage and car-loading of perishable farm products, and it is our aim to reduce wastage to a minimum, as there is no doubt that wastage, although indirectly, affects the prices both to our producers and consumers.

Instruction-work in Marketing.

This office continued the personal and mail instruction work in marketing during the year, and, where requested, interviews were given to returned soldiers with regard to selection of districts for the growing of various kinds of produce.

Fruits.

During the 1919 season small fruits were supplied this city in quantities just large enough to supply the trade. This was accomplished successfully owing to the heavy cannery demand. Practically all the strawberries came from the Japanese settlements at Haney.

While the quantity of strawberries and raspberries was not nearly so large as former seasons, it is quite evident that there was plenty, as the movement was slow on account of the high prices.

There is a large acreage of raspberries in the immediate vicinity of Vancouver and many consumers are supplied direct, thus making it impossible to estimate the supply actually sold to consumers for canning.

The demand was good for currants and fair for gooseberries, while the supply of loganberries was far below the requirements of the retail trade. It will not be out of place here to say that this berry is fast becoming a favourite amongst the housewives, and with the large increase in acreage due to bear this season we would suggest that some advertising be done to better acquaint the housewives on how to use this berry to the best advantage.

The greater portion of our supply of apricots and peaches are imported. Plums and prunes were scarce, and where we usually looked for heavy waste in these lines we are pleased to state that any wastage this season was due only to "plum-rot" and not slumping.

About this time the pinch of the sugar shortage was beginning to be felt and prunes, crab-apples, and pears suffered very materially. Nevertheless, the sugar shortage, which is no doubt only temporary, cannot be taken into consideration when one is dealing with the supply and demand of a market, and we are of the opinion that there is a great future for the Coast districts in growing Bartlett pears and Hyslop crab-apples in quantities large enough to ship properly.

Apples remained at a fairly high price all season, and, with the exception of a few cars of Wageners, British Columbia supplied our market. In spite of the high prices more apples moved into consumption this season than any season previously. British Columbia apples are now a permanent fixture on this market.

Nuts.

Small quantities of sweet chestnuts grown at Ruskin were well received by the dealers. This office has received many inquiries regarding the supply of these, as Greek fruitmen claim the sweet chestnut grown in British Columbia is far superior to that grown in Italy. As this

nut bears early and heavily in the Fraser Valley, it is our opinion that the Department could conscientiously encourage the development of this industry as a safe commercial enterprise. The quantity required each year to supply Western Canada is approximately four car-loads.

There was also a small quantity of filberts and walnuts from Mission, Hatzic, Ruskin, and Whonnock. The walnuts were of good quality, while the filberts appeared to have been picked too green, the kernels of which were badly shrunken.

VEGETABLES.

Leaf-lettuce came on the market early in the fall of 1918 and continued until late spring. The price averaged around $1.25 per dozen. Head-lettuce was imported from California in large quantities until June, when our local supply came in and continued until late in the summer or early fall. Although head-lettuce has only been produced here during the last two seasons in limited quantities, the growers are now able to produce this in quantities large enough for the local market, and the "heading" and quality is equal to the best. A few shipments of this lettuce were sent to the Prairie Provinces, and from reports we anticipate a good market in the future in the Middle-West cities.

Forced Rhubarb.—The shipments during January, February, and March were larger than former years and the demand continued good.

Field Rhubarb.—Only small quantities came in and prices remained high. Dealers were compelled to import to supply the demand.

Hothouse Tomatoes.—The supply was steady from February to September and prices remained high until the field stock came in in large quantities. The shipments of hothouse tomatoes to the Prairies exceeded former years by over 500 per cent.

Field Tomatoes.—The supply of these was equal to the demand, and owing to poor loading and the shipment of unripe stuff the wastage was heavy.

Peppers.—The major portion of our supply this season came from the Okanagan districts and most of the shipments were of No. 1 stock.

Cantaloupes.—The imports were heavy, and while our British Columbia shipments were larger than former seasons and the quality equal to the best, we must admit that our grading is far below the standard required to assure a fair price.

The supply of other vegetables was equal to the demand locally, with the exception of cabbage and parsnips. Several car-loads of mixed vegetables were exported.

POTATOES.

Early Potatoes.—Local-grown early potatoes arrived on the market on June 12th in quantities. Export shipments started on July 1st and continued until digging-time.

Late Potatoes.—The market during the first half of the year was "sluggish" and prices varied from week to week. Owing to the closing of the evaporators a heavy supply was thrown on this market, and the ability of this office was heavily taxed in order to keep the channels clear and save slumping and wastage.

During the last week in March 19,000,000 lb. of potatoes held by the evaporators for the United States War Department were offered to the local market. Practically 80 per cent. of these had been imported stock and on examination were found to be diseased. These were promptly quarantined and ordered resorted, regraded, and shipped back to the United States or sold here only in the large cities and with our special consent. This action was taken to safeguard our Province against the potato-diseases which infected this block of potatoes. Ninety per cent. of this block was shipped to Chicago, Kansas City, and Portland for distribution to other points. Over 300 men were engaged in resorting these and the work was done under the supervision of this office. It might be stated here that the writer personally recommended, on different occasions and very emphatically to the Chicago buyer, that these potatoes should be shipped in refrigerator-cars heavily iced. All cars were rolled without ice and the claims now under investigation by the Great Northern Railway Company amount to over $65,000.

The British Columbia main crop was somewhat badly damaged by frost and our loss was approximately 300 car-loads. Of this crop 250 car-loads have been exported to the United States to date.

Inspection-work.

During the year the total inspections made by this office were as follows:—

Potatoes for export	24,600	tons.
Potatoes for local use	4,800	„
Potato-seed inspection, 280 inspections	3,100	„
Apples for export	10,600	boxes.
Mixed vegetables	500	tons.
Total inspections made for report-work and instruction-work in connection with marketing, in all lines	7,200	
Total inspections *re* caterpillar-work	483	
Total inspections under "Eggs Marks Act"	619	
Potatoes ordered resorted	12,300	tons.
Potatoes condemned	8,300	„
Potatoes finally passed	12,000	„
Total inspections made on potatoes in addition to U.S. War Board block under quarantine	2,334	„

On U.S. War Board stocks under quarantine, 3 men 10 weeks, 1 man 2 weeks.

When practicable, attention was given to the hay, grain, and live-stock markets, and much valuable work was done in assisting up-country districts to secure hay from farmers on the Lower Mainland. We also assisted farmers in making collections and adjusting freight claims, etc.

Respectfully submitted.

R. C. Abbott,
Coast Markets Commissioner and Inspector in Charge of Exports.

REPORT OF PRAIRIE MARKETS COMMISSIONER.

J. A. Grant.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I beg to submit my report for the year 1919.

The season of 1919 has been one of mixed experiences and one in which both climatic, elements, and mechanical conditions have had an influence. In the mechanical part the strikes, sugar shortage, and box shortage have played a part, not new, but very hard to combat. The sugar shortage came as a bolt from the blue, and for the first time in the writer's recollection its extent was universal and no relief could be obtained from any source.

The season opened with unusual activity on the part of jam-factories, when keen competition for the year's crop raised the price of jam-berries from 8 cents in 1918 to 16 cents and up for 1919. The bulk of the contracts were made at 16 cents f.o.b. shipping-point.

Application by Express Companies to abolish Commodity Rates.

C. E. McIntosh, in charge of transportation, Ottawa, called our attention to the above application, which in our opinion threatened the existence of the fruit and vegetable industry in British Columbia. We suggested that the British Columbia Fruit-growers' Association take charge of the case, and a committee from that body secured evidence which was presented at sittings held at Vernon and Nelson. R. M. Winslow represented the case for the British Columbia Fruit-growers' Association, while the interests of the Department of Agriculture were represented by your Markets Commissioner.

The result of the fight waged by the Provincial Government shippers and Prairie jobbers, as well as the fruit interests of Eastern Canada, was a complete victory for the growers, as no increase was granted the express companies. The point assailed by the express companies was the commodity tariff covering fruit and vegetables making them subject to general tariff, and the finding of the Board of Railway Commissioners was favourable to retaining this and against any increase in the rate.

EXTENDING MARKETS TO GREAT BRITAIN.

During six weeks in British cities the wholesale fruit trade was canvassed on the prospects for marketing British Columbia apples and pears. The opinions of auctioneers, private treaty, and f.o.b. buyers were freely expressed and were all of a favourable kind. Several of the leading buyers were invited to visit British Columbia, and seven of the number took advantage of the reconstruction to visit British Columbia and were very favourably impressed with our apples, pears, and plums.

A considerable number of cars of apples were bought f.o.b. shipping-point, while many went forward and were sold by private treaty. The prices obtained by the latter method and at auction were equal to the best obtained on the markets of Europe, and the trade was very favourably impressed with our fruit. Concentration in marketing was largely responsible for this satisfactory advertisement, and the quantity and quality of fruit sent forward was an agreeable surprise to British fruit-dealers.

Some very important things were demonstrated to be necessary to prevent loss and misunderstanding: The securing of boxes by wiring ends to prevent lids coming off; using the words "British Columbia" on every box; that sizes from 120 to 188 are most popular; that large sizes are always lower-priced than medium sizes; that the grade No. 1, No. 2, and No. 3 is confusing on our boxed apples, as the same marking applies to barrels. The trade suggests that we follow the plan of our Washington and Oregon competitors and mark box stuff "extra fancy," "fancy," and "choice." Any one seeing apples coming out of a barrel and out of a box at the market end would see the force in the argument for a change in nomenclature. Fancy and No. 2 should be equal quality, and apples of equal quality marked No. 2 made a less price than fancy apples, and the grade-mark was the only difference. Concentration in bulk on the market and shipping only our best apples in Britain is very important. Although there is a demand for No. 2, the supply of this grade should be withheld until the superiority of our apples is fully established.

THE SEASON ON THE PRAIRIES.

Notwithstanding the persistent efforts of Prairie jobbers to "bear" the market by buying from hand to mouth and refusing to buy in advance to any extent, the prices set by the shippers early in the season were well maintained. Most of our strawberries and raspberries arrived in car-lot shipments. These berries averaged $4 per crate f.o.b. shipping-point. About forty cars of British Columbia strawberries found a ready market at the above rate. The price predicted by your Markets Commissioner last year for berries was fully realized, and it is safe again to predict that prices will be higher in the season of 1920. The condition of arrival was excellent.

Raspberry shipments were greater by L.C.L. than in car-lots owing to the unfortunate experience with refrigerator-cars last year. The raspberry shipments by car-lots greatly increased and all arrived in a satisfactory condition, excepting two cars to Winnipeg, which showed some shrinkage due to mould. There is good reason to believe that air-cooling before and during transit is preferable to refrigeration for fruits. Experiments will be undertaken this year under the supervision of the Dominion and Provincial Governments and express companies, so that evidence may be on hand to guide shippers as to the best method of shipping perishable fruits. The two-stop privilege was continued by order of the Board of Railway Commissioners. This privilege is indispensable and future efforts to remove it should be resisted by growers and shipping organizations.

PUBLIC MEETINGS.

Addresses were delivered at Penticton, Kelowna, Vernon, Summerland, Salmon Arm, Burnaby, Mission, Hatzic, Hammond, and Chilliwack on the value of organization and Prairie market requirements. This was followed by a campaign in the Kootenay, and the work of organizing that district for markets was fully discussed at Nakusp, Robson, New Denver, Bonnington, Shoreacres, Nelson, Crawford Bay, Queens Bay, Harrop, Willow Point, and Kaslo.

PACKING AND GRADING.

A noticeable improvement of fruit-pack was noticed during this season. Few complaints of short weight were received. The greatest improvement was noted in strawberries, raspberries, and apples.

Several isolated districts marred the general good effect obtained by organized districts, and a campaign should be immediately organized to give the struggling growers instructions as to the market requirements. Apple-packing schools and short courses would do much towards this end.

Advertising.

During the height of the sugar shortage this office, on behalf of the British Columbia Fruitgrowers' Association, conducted a vigorous campaign of publicity. Considerable advertising was done in the city dailies. Many articles were written and interviews given commenting on the emergency.

British Columbia booklets were mailed to inquirers, giving information on canning fruit without sugar. (This propaganda is still unpopular on the Prairies and very little fruit was canned without sugar.)

Advertising the best time to buy fruit and vegetables during the peak of the various fruits is more effective; this action stimulates distribution at the right time.

Prairie Markets Bulletin.

This publicaion is fast increasing in public favour. The circulation in 1918 increased to 1,500 weekly, and up to November, 1919, the circulation has reached 2,500 weekly. The demand for it in Great Britain from the wholesale trade there exceeds 100.

We were forced to increase its size owing to the demand for broader market information, which now includes vegetables, hay, straw, grain, and honey.

Potatoes.

We expect to bring potato-marketing, especially quotations for early potatoes, more into prominence. There are about four weeks each year when the bulk of the Prairie supply of potatoes can be drawn from British Columbia.

Owing to the unorganized state existing amongst Lower Mainland Chinese they are at the mercy of the jobbers and brokers, who see-saw their quotations without regard to the market. Last year potatoes were selling in Calgary at $80 per ton when the Fraser Valley offerings were made. Their first figure quoted on a bare market was $70 per ton, then $65. At this price a sale was made of a car-lot. Before it was loaded $60 was quoted from Vancouver and the $65 car was duly cancelled. Before a potato rolled the price reached $55 and the market was hungry for new potatoes. When potatoes were only three-quarters grown they had reached the lowest price of the year.

The chief trouble in this muddle is that the Upper Country, where many white men are growing potatoes, have to meet the prices named by individuals without any consideration to the cost of production. The need of a strict potato grade was never greater than now. If British Columbia will line up to the standard they are maintaining in organized apple-shipping, the potato industry of the Province would increase to tenfold its present size. A system of grading and inspection would bring about this result. To-day our Fraser Valley seed-potatoes are selling in Seattle at $100 per ton wholesale when the ordinary price for selected potatoes for culinary purposes is around $70 per ton.

Ungraded and nondescript potatoes can be bought much cheaper. There is only one way to make the potato business pay, and that is a system of grading and inspection and supervision during the growing period.

Onions.

The onions have been of good quality and well cured, but the size shows careless growing methods and a standard grade should be vigorously demanded. Prices were good, but the name we are making for grade is not creditable when our possibilities are taken into consideration.

Hay, Grain, etc.

A beginning was made during last season to get in touch with Prairie farmers and organizations who were seeking a market for feed-oats, wheat, baled straw, and hay.

An advertisement was carried for one month in the *Market Examiner*, Calgary, and many responded with their offerings. A number of British Columbia buyers were put in communication with Prairie sellers. We will continue this policy next season and will extend it, believing that future trade will be highly beneficial to farmers in general.

In this connection, as well as in fruit-distribution, the effort to connect individuals is laborious. The organizations of the Prairies and of British Columbia can and will make an economic success of interprovincial trading. Individual efforts are too cumbersome to be effective.

RHUBARB.

Rhubarb is produced in smaller quantities than formerly at Hatzic and Mission. There is a market for an increased supply at least double the present output. If this industry could co-operate with early-vegetable growers and ship in mixed cars it would meet the needs of Prairie buyers better than shipping in straight cars of rhubarb.

The season of 1919 was very satisfactory to the growers and good prices were obtained. The Vernon Fruit Company, of Calgary, handled most of the car-lots shipped from British Columbia.

BERRY SHIPMENTS.

All berries except blackberries were marketed before the acute sugar shortage became pronounced, and therefore commanded good prices. An average of $4 per crate for strawberries, raspberries, and loganberries was netted to shippers f.o.b. shipping-point for good berries. Very little preserving was done as the Prairie housewife thought the price too high.

The demand was greater than the supply, chiefly caused by heavy jam-factory contracts in the Province and also in Ontario and the State of Washington. The original contract price of 16 cents for strawberries was increased as the demand became keen and 17 cents was obtained by some growers. This industry is very much underdone, especially in strawberry and raspberry production. More than double the expected output was shipped to the Prairies owing to the favourable rain at the right time.

Prunes opened at a fair price. The United States points expected to take care of their own crop. Sugar shortage there caused prices to slip under those set by British Columbia shippers, resulting in Prairie jobbers buying many cars of Washington fruit at a time when British Columbia was coming on the market.

The same cause brought about the same effect in marketing our prunes and peaches, and crab-apples were the worst hit of all. The sugar situation reflected on the sale of early apples used for pies, etc., and during the whole season its shortage has lessened consumption.

SUGAR SHORTAGE.

Early in August a serious shortage occurred. The cause of this has never been fully explained, but the loss to fruit-growers was great. Strenuous efforts were made by your Markets Commissioner, calling attention to the immediate need of an embargo on export sugar. The British Columbia Fruit-growers' Association, co-operating with the British Columbia Traffic and Credit Association and the Western jobbers, sent R. M. Winslow to Ottawa, and after many interviews and establishing a cast-iron case for supply to save the British Columbia fruit industry, orders were made to supply 1,800 tons of sugar to the West under conditions that it was to be used for preserving Canadian fruit. The sugar that did arrive was not so applied and the order of the Board of Commerce was almost totally ignored.

The amount of sugar promised was not shipped and the promises made to Prairie buyers of fruit of adequate supply of sugar to preserve it were not kept. At no time from August 1st to date has there been enough sugar in the West to supply ordinary domestic needs, let alone preserve fruit, and at this date, early in January, we read official statements about supplies of sugar existing in the hands of wholesalers and others that have no foundation in fact. The fruit industry is so allied to the sugar-supply that the prevention of shortage of sugar is the only means of avoiding disaster to the fruit industry. On January 3rd we wired the Chairman of the Board of Commerce as follows:—

VICTORIA, B.C., January 3rd, 1920.

Chairman, Board of Commerce, Ottawa.

What action does your Board propose to prevent repetition of loss to fruit-growers through failure of sugar-supply last year? Will discuss situation at Vernon and Vancouver this month. Please give definite assurances or reasons why they cannot be given.

J. A. GRANT,
Prairie Markets Commissioner,
Department of Agriculture, Victoria, B.C.

The following reply has been received:—

OTTAWA, January 6th, 1920.

J. A. Grant, Esq.,
Prairie Markets Commissioner, Department of Agriculture, Victoria, B.C.

DEAR SIR,—In reply to your telegram of the 3rd inst., I beg to state that this Board has nothing to do with the distribution of sugar in any part of Canada, its function being merely to see that unfair profits are not exacted for necessaries of life. I shall, however, forward your telegram to such department of the Government as I think may be able to appropriately deal with the question. If, however, during the early summer you find there is likely to be repetition of the serious situation in which the British Columbia fruit-crop was placed by reason of the sugar shortage last year, I shall do my best to provide against a similar contingency happening this year.

Yours truly,
W. WHITE,
Secretary.

In view of the above reply, passing along the responsibility for providing sugar, it behoves our shipping organizations to press for an effective embargo on export sugar and have prices set more in line with competitive markets, and to insist on Federal Government regulation of shipping to ensure sufficient quantity of raws coming in to allow refineries to meet the known demands for domestic needs, preserving of fruit, and manufacturing requirements.

1919 APPLE DEAL.

The unexpected freeze in October brought disaster to many of our late-keeping apples. Box shortage and car shortage combined to congest packing-houses and picking had to be proportioned to the movement. Most of the loss would have been eliminated if apple-growers had made provision for temporary storage on the farm; very few orchardists have provided any such storage. We believe the lesson of that freeze will be the means of correcting this short-sightedness.

The question of selling and shipping-out of all apples before the end of December has been decided by some as being more profitable on the average than storing and feeding on the market. It is very easy to suggest this, and in theory it looks well.

If it pays the shipper best to ship before the end of December because prices in spring do not on the average warrant storage, it is obvious that some one is taking a loss by storing. Prairie buyers are refusing to continue this storage for the fast growing supply from our Province. Sufficient cars cannot be obtained to move the crop by that date; these with many other factors entering into the question places the solution of the problem on the growers and shippers.

We must either give credit, consign, or store a reasonable portion of our apples, and in our opinion storage with a view to feeding the market will become necessary. High prices are retarding consumption, sugar shortage has cut down the culinary demands, and our apple market had to be extended this year to overcome these difficulties.

Great Britain took about 400 cars and could have taken four times that amount at prices realized there. About 300 cars went to the United States markets and our Jonathans commanded a premium over all competitors in the New York market. Eastern Canada took about 250 cars, shipments going as far as St. John, N.B. Prairie markets absorbed about 250 cars more of our apples than last year, due to the fact that comparatively little competition came from the United States.

It is estimated that the annual output of British Columbia will be 6,000 cars of apples in three years, and that the Prairies and home market will only take care of 4,000 cars of this amount. We consider this a fair estimate.

Growers should not allow this to retard their planting, provided they plant the right varieties in proportion to the market's demands in the right locality. We have an even chance on the markets of Great Britain and Europe with all competitors, and the British trade alone will buy 2,000 cars of our apples annually.

Considering the displacement of barrel apples by boxed stock all over Canada and the United States, we think our market prospects good. We cannot survive as the fittest if we slacken up on our apple-planting.

UNITED FARMERS BUY B.C. APPLES.

We are pleased to report that for the first time the United Farmers of Alberta, Saskatchewan, and Manitoba have bought British Columbia apples. We prepared a statement explaining that

extra fancy equalled No. 1; fancy, No. 2; C Grade, No. 3. Since that time the apples have been delivered and nothing but praise as to their quality has been heard.

There is every possibility that the Prairie farmers' apple-supply in the future will come from British Columbia. Buying from the United Farmers of the Prairies is also on the increase in British Columbia. Interprovincial trading is encouraged by the present adverse rate of exchange.

The abnormal demand for small fruits and stone-fruits for preserving has again raised the prices. Contracts for 1920 have been made for strawberries at 20 cents per pound and for sour cherries at 9½ to 10½ cents per pound, containers found. These prices indicate very high prices for fresh fruits.

In conclusion, we invite a continuance of the inquiries which featured the 1919 season, both from buyers and sellers on both sides of the water, also in the Western States.

Our British visitors were struck with the thoroughness of our organization, one of them claiming that it was the most perfect he had come across. Our future can be helped by more sacrifice of individual liberty in the common good by so-called independent shippers, who absorb all the benefits of co-operative efforts without becoming responsible in any way for the success it has brought about.

Respectfully submitted.

J. A. GRANT,
Prairie Markets Commissioner.

REPORT OF PROVINCIAL INSTRUCTOR OF HOUSEHOLD SCIENCE.

MISS OLIVE E. HAYES.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I have the honour to submit my annual report for the year 1919.

CREATION.

Owing to numerous requests having been received from Women's Institutes of the Province for assistance and direction along the lines of home economics, the Hon. E. D. Barrow, Minister of Agriculture, decided to create a Household Science Branch in the Department of Agriculture. At his request I took charge of this division of the work on January 1st, 1919, as Provincial Instructor of Household Science and Official Organizer of Women's Institutes.

SCOPE.

The duties of this Branch were to consist of the following: Conducting short courses in home economics, conducting demonstrations, preparation of publications, judging at fairs, dealing with correspondence relating to household science, organizing Women's Institutes, co-operating with the Women's Institutes in their various activities, and co-operating with the Education Department in the extension of household science in rural schools.

ACTIVITIES.

Demonstrations and Short Courses.—The work during the year consisted largely of short courses and lecture demonstrations in connection with the Women's Institutes of the Province. Many requests for such courses and lectures have been received from various organizations and societies throughout the Province, as well as from the Women's Institutes. The Women's Institutes have received my first attention, but I regret that during the year I have been unable to visit all of the institutes who applied for instruction. This phase of the work alone requires the attention of at least two instructors. During the year 112 demonstrations on home economics were given to Women's Institutes, Boys' and Girls' Clubs, and at exhibitions.

Following is the list of lecture demonstrations with subjects: Foods and dietetics, 77; canning and preservation of foods, 15; laundry and dry-cleaning, 17; commercial jam-making (Errington Co-op.), 3.

The territory covered during the year was the Lower Mainland District, the Kootenay District, and parts of the Okanagan and Vancouver Island Districts. The classes and meetings

A portion of food exhibit displayed at Provincial Fair, New Westminster.

OF AGRICULTURE
SCIENCE BRANCH
Mothers do you want your Children to be Healthy and Happy?
To Grow and make Strong Men and Women, then you must see that they are fed properly every day.
MALNUTRITION
PHOSPHORUS
Have your children poor teeth
weak bones?
Is their growth stunted?
Do they readily contract disease?
the foods rich in Phosphorus
HERE IS IRON
HERE IS LIME
DR. E. V. McCOLL
FACTS
Each of these foods contains

New Westminster Exhibition, 1919. Exhibit of foods and food values suitable for young children, made by the Domestic Science Branch of the Department of Agriculture, Victoria, B.C.

held were exceptionally well attended. I found the women intensely interested in the vital importance of correct feeding, and I think that the institutes realize more fully than ever that nutrition is one of the biggest factors in health.

JUDGING AT FAIRS.

The following fall fairs I attended in the capacity of judge: Central Park, Strawberry Vale, Milner, Surrey, Colwood, Victoria Home Products, and New Westminster. Mrs. Carter, of Victoria, assisted me at New Westminster and acted as judge at Parksville.

At Colwood, Victoria, and New Westminster lecture demonstrations were given in canning and jam-making and use of the pressure cooker. Educational food displays, teaching the principles of proper feeding, and the comparative nutritive value of commonly used foods were shown at New Westminster and Victoria Fairs.

The products judged were fair in quality, but the small number of entries in many cases showed a lack of interest on the part of the women. It is hoped, however, that next year the Women's Institutes of the Province will be in a position to take a more active part in this important division. Where prizes were offered for children's work there was keen competition and splendid work shown. At Surrey and Milner this department was outstanding owing to the organized efforts of the teachers and instructors in the various schools and the enthusiasm created among the children. The educational value of such work in connection with schools cannot be estimated.

PUBLICATIONS.

There has been a great demand for food and canning bulletins, and during the year I prepared Bulletin No. 83, "Preservation of Food," 16,000 copies of which have been distributed among the Women's Institutes and in connection with food exhibits. Three circulars, Nos. 24, 25, and 26, on foods for children were issued and a large number distributed. During the year special stress was put upon the increased consumption of milk, and in connection with this subject a circular was prepared on the vital importance of milk in the diet. A start has been made on a bulletin, "Foods and Cookery," and during the coming year it is hoped it will be in circulation.

SUMMER SCHOOL.

Twenty-two lectures were given to the students at the summer school for teachers, which was held in Victoria during the month of July; the subjects taken were "School Lunches" and "The Teaching of Domestic Science in the Rural School."

FOOD EXHIBITS.

Three food exhibits were planned and displayed. These were held at the Provincial Fair, New Westminster; the Home Products Fair, Victoria; and at the Vancouver Island Conference of Women's Institutes, which was held in March at Duncan.

A central feature were show-cases displaying menus with their proportionate amount of calories necessary for the various ages of children. The foods on display were of the simplest variety and only the simplest rules of cooking being necessary in order to prepare the demonstrated menus. In conjunction with this part of the exhibit a set of food-cards stating the principles of proper feeding, and giving menus suitable for children from one to two years, two to five years, and five to seven years, were distributed to those people wishing information.

Another part of the exhibit was a display of foods high in lime content, those rich in iron, and those rich in phosphorus. The importance and necessity of these organic minerals in the diet was clearly explained by large printed cards.

One hundred caloric portions of protein, carbohydrate, and fat foods were shown in separate show-cases, making plain the fact that the amount of money paid for a food is no indication of the amount of food value it contains.

Another feature of the exhibit was a display of foods which promote growth and give health. In connection with this feature of the exhibit, photographs of animals, which Dr. McCollum, of Johns-Hopkins University, had used for his experiments on "Newer Nutrition," were shown. These experiments showed conclusively the effect of incorrect feeding on growth and mentality. Foods containing the substances which prevent such diseases as scurvy, beriberi, and many other forms of malnutrition were arranged, emphasizing the vital importance of such foods as milk, butter-fat, egg-yolk, and green vegetables in the diet.

Mrs. Carter, of Victoria, assisted me in arranging the exhibits at New Westminster and Victoria Fairs, and in taking charge during the time of the exhibit for the purpose of explaining it, and answering questions.

These exhibits drew a great number of interested people, not only the women, but men who are interested in this important question. The practical value of food exhibits in teaching the comparative nutritive value of foods and the diets necessary to induce health and growth and good nutrition cannot be estimated. This method of making plain the principles of feeding is more effective and far-reaching than the reading of all the bulletins and scientific articles that can be had.

CORRESPONDENCE.

A number of letters were received asking for information and help in connection with problems relating to home economics. In addition, the usual number of letters in connection with lecture demonstrations and itineraries were received and answered.

CONCLUSION.

This report would be incomplete without reference being made to the appreciation of the Women's Institutes of the Province for the assistance given them by the Department and their recognition of the necessity of a Home Economics Division in the Department of Agriculture.

All of which is respectfully submitted.

OLIVE E. HAYES,
Provincial Instructor of Household Science.

REPORT OF SECRETARY OF BRITISH COLUMBIA WOMEN'S INSTITUTES.

MRS. V. S. MACLACHLAN.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—In submitting the annual report for the year 1919, it is with a feeling of relief that the war is over and sorrow over the empty places in so many of the homes of our members.

In looking over the work done during pre-war years, the home, the garden, and poultry received attention individually. We were more or less inclined to the material side of life. Then the war came like a thunderbolt from a clear sky to most of us, although our great men had for some years been seeing the sinister cloud gathering.

War came, and we could not believe that it would be for long—three months or six months—because we said: "Conscripts cannot fight like volunteers"; but we found that if they couldn't fight like volunteers they could fight like a soulless machine. With every fresh horror, with every sickening defeat, a renewed determination, "We must win the war," became the living, ever-present sentiment of each member of our organization.

I think it was Horace Greeley who said of the American Civil War that it "was won on the bended backs of the women," and as we read of the work done by the women on the farms left without men, and the Red Cross work, in addition to this, by hands hardened and roughened by such unusual toil, we feel at least that the burden laid upon us was borne cheerfully and, thank God, successfully.

It may be too soon yet for us to count the benefits accruing to us. Our vision is still too tear-dimmed to see clearly, and yet we are aware of a new spirit among us, or rather of a renewed spirit, a wonderful spirit of goodwill and co-operation, the same spirit which actuated men of all ranks to stand side by side in the trenches and die shoulder to shoulder for a common cause, the cause of humanity.

We are now turning that wonderful spirit of goodwill and co-operation to our children, to our babies, and to our mothers with the same grim yet loving determination in this same cause of humanity, for with this spirit is the knowledge that "the colonel's lady and Judy O'Grady are sisters under the skin"; that our King and country truly need the son and daughter of Judy O'Grady just as much as they need those of the colonel's lady. The colonel's lady knows it and

Judy O'Grady knows it, for again the war showed us that the man or woman is unborn who can say which cradle rocks the genius or under which roof the world's saviours are being reared. Realizing the need, true to British traditions, we are shouldering the responsibility. New institutes are springing up with child-welfare, school-welfare, and district nursing, sanitary improvement and community welfare, etc., as the aims and objects. There are constant inquiries for literature, information, and direction on how to conduct the institute in order to get the best and immediate results along these lines.

New Institutes.—New institutes formed during the year 1919 are Kootenay Valley, Bonnington and South Slocan and New Denver in the Kootenay and Boundary District; Armstrong has been organized and will be formally inaugurated at an early date this year; Langley Triangle, South Vancouver, and Mount Lehman in the Lower Mainland, and Strawberry Vale and Denman Island in Vancouver Island District.

Of the sixty-four institutes in active operation, the membership is 2,940; money raised, including Government assistance, $18,874; money disbursed, $15,261. Thirty-nine held either flower-shows or exhibits of school-work. Several held health exhibits, using panels loaned by the Board of Health, and exhibits of proper food for children of different ages and proper school luncheons. Lectures by different speakers on various subjects, such as "Teeth of School-children," "Venereal Disease," and "State Health Insurance," were included in these exhibits.

School-welfare.—Twenty-four report active work in the school-welfare. This includes providing a hot lunch for the school-children, improving rural school-grounds and (Heaven knows they need improving!) sanitary conditions, agitating for consolidation of schools, supporting the school-gardens, domestic science, and manual training. One institute erected a shed where the children may play on rainy days; another conducts a juvenile musical club; another erected a drinking-fountain in the playgrounds as a memorial to the fallen soldiers; and in most of the institutes a school committee is formed which visits the school periodically.

Public Health.—Twenty-two institutes report active efforts along public-health lines, while just about the entire number is interested and anxious to have a public-health nurse in the district. The entire sixty-nine which will be in operation before the end of January, 1920, stand ready to support to their limit the public-health nurse directly she is available.

In the Okanagan District three of the large institutes put on the child-welfare exhibit of Rev. Hugh Dobson's, asking the co-operation of the adjoining smaller institutes. In each case the exhibit was very successful, numbers attending and showing the greatest interest in the subject-matter both of the pictures and lectures, and has given the public-health movement an added impetus.

In connection with this, I may say that a resolution sent in by an institute, which is being endorsed by not only the Women's Institutes, but the farmers as well, is the following: "The Women's Institutes of the Province respectfully petition the Hon. the Provincial Secretary to make such provision in the Estimates to be presented to the House during the coming session that will allow of assistance being granted to such districts as will upon examination be proved to be unable to assume the total cost of the installation of a health centre presided over by a public-health nurse."

The Department was fortunate at the beginning of the year 1919 in securing the services of Miss Olive E. Hayes as Demonstrator and Organizer for the institutes. Short courses in household science, including such subjects as "Milk," "Vegetables," "Food for the Growing Child," "Invalid Cookery," and "Dry-cleaning," have been given to the institutes in the Lower Mainland and Kootenay Districts, and splendid exhibits of balanced foods have been put on at the different fairs under the able direction of Miss Hayes.

There has been some interest evinced in industries such as knitting, weaving, basket, toy, and glove making. This is only in the preliminary stages yet, but promoting and educating is the very important work that the institutes can do.

No institute has reported study courses other than a short time given at each meeting to the reading of portions of the "Busy Woman's Handbook."

Four district conferences were held in the Province during the month of October as per attached. (*See* Appendices Nos. 31, 32, 33, and 34.)

Respectfully submitted.

V. S. MacLachlan,
Secretary, B.C. Women's Institutes.

REPORT OF CHIEF INSPECTOR OF APIARIES, KOOTENAY DISTRICT.

W. J. SHEPPARD.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

SIR,—I beg to submit my report herewith as Chief Inspector of Apiaries for the Province, together with the reports of the Inspectors for Vancouver Island, Greater Vancouver, Lower Fraser, and Upper Fraser, for the past season.

Representations having been made to the Department in 1918 as to the seriousness of the foul-brood situation on the Lower Mainland, I was requested to make a special inspection in the Surrey Municipality during June and July of that year. About a month was spent on this work. Out of the 476 hives examined, 235 were found to be affected with European foul-brood. It was therefore evident that quick and drastic action was necessary to endeavour to get the disease under control, and also to prevent it from spreading over the whole Province. With the approval of the Minister of Agriculture, the Hon. E. D. Barrow, amendments to the "Foul-brood Act, 1911," were framed as soon as possible, which were afterwards passed into law by the Provincial Legislature as the "Apiaries Act, 1919." Under the authority of the new Act the Minister declared the whole of the Lower Mainland as far west as Agassiz to be an infected area, in which the moving of bees is now prohibited without a certificate of inspection showing freedom from disease. In order to keep trace of all persons keeping bees the new Act requires all bee-keepers to register annually on or before March 31st, and pay a small registration fee so as to assist in defraying the greatly increased cost of protecting their interests. This provision of the Act has been resented by a few, who appear to look on it as an additional tax, but when it is considered that a visit from the Inspector, apart from the question of protection from disease, is usually worth much more than the fee payable, from an educational standpoint alone, it can readily be seen what little grounds there are for complaint.

The three additional Inspectors appointed last spring—namely, W. H. Turnbull, Lower Fraser; A. W. Finlay, Upper Fraser; and A. Keir, Greater Vancouver, the two latter returned soldiers—although fresh to their work, have been untiring in their efforts, and, as their reports show, have accomplished a very great deal in combating foul-brood. Their visits have also proved to be of much value in educating and stimulating the bee-keepers to adopt improved methods, thereby raising the standard of bee-keeping and increasing production. The splendid exhibits at the Vancouver and New Westminster Exhibitions last fall, aggregating about 3 tons of honey at each, which were the most extensive and the best ever made in the Province, bear testimony to the value of the work done during the past season. Another distinct advantage that has resulted from the more thorough inspection-work is the large number of Italian queens that have been introduced to colonies on the Lower Mainland during the past season, where it was the exception before to find anything but black bees, Italians being considered more immune to disease than the latter and better honey-producers.

KOOTENAY DISTRICT.

In the Kootenays the past season has been about an average one for honey production. In two districts, Creston and Castlegar, owing to the prolonged dry weather, honey-dew was gathered by the bees and darkened the honey. Three colonies in two apiaries were found affected with American foul-brood, and it was proved beyond a doubt that the disease had been brought in with package bees imported from the United States. In the Slocan District 2,100 lb. of honey was obtained from three hives, spring count, the largest yield so far recorded in the Province.

OKANAGAN DISTRICT.

L. Harris, Inspector for the Okanagan, states that two hives at Penticton and two at Summerland were found affected with American foul-brood, and that the honey-crop is estimated to be 50 lb. per hive.

The estimated honey-crop for 1919 is given in Appendix No. 35.

All of which is respectfully submitted.

W. J. SHEPPARD,
Chief Inspector of Apiaries.

A good specimen of a modern apiary in British Columbia. A. I. Alexander, Ladner, B.C.

A Chinese apiary in Lower Fraser Valley prior to destruction by Department Inspectors.

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REPORT OF INSPECTOR OF APIARIES, OKANAGAN DISTRICT.

L. Harris.

Dr. D. Warnock, V.S., O.B.E.,
Deputy Minister, Department of Agriculture, Victoria, B.C.

Sir,—I have the honour to submit report of bee-inspection work and general conditions of the bee-keeping industry in the Okanagan and Upper Country districts of British Columbia.

The weather conditions in the spring of 1919, though comparatively late, were the best in years for the building-up of the colonies. There appeared to be no set-back to bees, from the earliest blossoming flowers, such as dandelions, fruit-trees, etc., until the clover-flow was ready, and many of the colonies stored quite a respectable surplus from the early nectar-bearing plants; but, alas! it was too good to last, and the clover-flow was one of the shortest the writer has ever known, commencing about June 18th and ending July 8th, and many of the colonies from that time lost weight to the extent of 14 lb. in less than three weeks, with never a rally that amounted to anything as regards surplus.

As a consequence the queens discontinued laying, with the result that many hives having old queens in them will become very weak towards spring, by reason of the working-bees being too old at the commencement of the winter, as they will have run their course and be ready to die just at the time when the hives need all the energy and vitality the bees can supply; hence the importance of requeening at the close of the main honey-flow in order to fill the hives with young bees of the right age to go into winter quarters.

Inspection.—Inspections were commenced early in April in the Vernon District, and all apiaries examined appeared to be clean; no trace of disease being found.

On April 16th proceeded to Rutland by request of one large bee-keeper to examine his hives, he having sold a number of colonies and wishing to have them examined before removal. As far as could be seen, no disease existed, but upon going into this district again later in the season one colony was discovered having American foul-brood, which was totally destroyed by fire, etc.

On April 10th, by request, we went to Ashcroft to examine some bees whose owner wished to move them from Ashcroft to Salmon Arm, but owing to some transportation trouble we did not get there until the day after we had arranged, and the bees were loaded into a car, so that a proper examination was not possible at that time.

Most of the bees in this district were in good condition "very strong and early." Having examined all the bees in this district that we could locate, we proceeded to Lillooet and Lytton, where conditions generally were earlier and colonies were building up in good shape, some of them having second stories on them and storing a little honey in them.

After leaving Lillooet on our return journey the weather turned very cold, and when we arrived at Ashcroft on May 2nd our last examination was made while it was snowing.

Further inspections were for the time being out of the question, and we turned our attention towards Vernon to await more favourable weather conditions.

On July 15th a second trip down the Okanagan Lake District was made, and apiaries generally were clean and in good condition until we got to Rutland, where one hive was found to be infected with American foul-brood, as before stated. This district, which was a hotbed for foul-brood four or five years ago, appears to be practically clean at the present time.

Kelowna also apparently is free from disease, as also is Peachland. Summerland has developed American foul-brood in two different apiaries. It is puzzling and perplexing to know how the disease gets into a new district where it is claimed no bees from outside the Province have been brought in, other than queens.

Penticton also developed the disease in three different apiaries. It is easy to account for two of the cases, which were offshoots of one that was simply rotten, but from where the other one got it is still a mystery. It may yet develop in the bees where these bees were procured, though no trace could be seen of disease when they were examined.

Taking up Bee-keeping.—The number of persons taking up bee-keeping as a means of livelihood is steadily increasing, and many who have hitherto kept only a few colonies are increasing their stock annually, while many others are coming into the business with the ultimate view of making something out of it.

Referring to the latest bee legislation, with regard to the registration of bees, this does not appear to be in many quarters very popular; the complaint being that it is not equable, and that

its aim is to put the small bee-keeper out of business, their contention being that a bee-keeper, "if he chooses," can keep a thousand hives or more for the same amount as a smaller bee-keeper can keep twenty hives, and that a more equable arrangement would be to charge a maximum fee and 10 cents for every hive in the Province. This would hit the larger bee-keeper harder and relieve the small man who keeps only a few colonies for the benefit of his fruit-crops, and is not interested in them further. On the other hand, the industry should be protected against careless bee-keepers, such as keep only a few and leave them generally to look after themselves.

That the bee-keeping industry is here to stay, and to benefit mankind generally, there is no manner of doubt, and that $1,000 a year can be made easier and with less effort than from any other branch of industry connected with agriculture, providing one is well acquainted with the habits of the honey-bee, is certain; therefore this industry should be encouraged, not only because a good living can be made, but because the product is one of the most wholesome and enjoyable of staple foods that can be produced. Therefore let us produce honey, and if we want something more to do let us produce more honey. The demand for it, in spite of the higher prices, is greater to-day than ever before in the history of bee-keeping, by reason of its food value becoming more and more appreciated.

Respectfully submitted.

L. HARRIS,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, LOWER FRASER DISTRICT.

W. H. TURNBULL.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit my report as Inspector of Apiaries for the season ending October 31st in Delta, Surrey, Langley, Matsqui, Maple Ridge, and Richmond Municipalities.

The inspection-work was started on April 21st, and from that time until October 31st the distance covered by motor-car was 5,915 miles. Outside of the regular inspection-work, forty-seven special trips were made for the purpose of inspecting bees the owners desired to move, both in this and other districts.

Most of the regular inspection-work was carried out in Surrey and Langley Municipalities, as these two districts were badly affected with European foul-brood in 1918. In fifty-four apiaries in Surrey European foul-brood was found or reported, and early in the season dequeening and requeening after twenty-one days was the system of treatment advocated, and in most cases carried out, as the Inspector usually removed the old queens. It was found in June, however, that bee-keepers were experiencing considerable trouble in obtaining queens when required and a good many lost colonies from this cause. A new system of treatment was then tried. The combs containing diseased brood were all removed from the hive and destroyed and full sheets of foundation substituted. A new Italian queen was ordered, and upon her arrival the old one was removed and the new one introduced. This was found to work exceptionally well and European foul-brood was rarely found on the second visit. In most cases two visits were made if there were many hives affected.

In Langley Municipality thirty-two cases of European foul-brood were found and the same course of treatment carried out as in Surrey.

No disease was found in Matsqui, with the exception of sac-brood, which was very prevalent, requeening being recommended in every case. In Surrey, Langley, and Matsqui 60 per cent. of the bees have been requeened with good Italian stock.

In Maple Ridge two apiaries were found with European foul-brood, and in both cases the diseased colonies were destroyed, with the full approval of the owners, who were glad to thus have all source of infection removed. In isolated cases this is no doubt the best treatment to follow.

Richmond Municipality was not given a very thorough inspection owing to so much disease being found nearer home. It is safe to say that the whole district is more or less affected with European foul-brood, and it should get a thorough inspection as early as possible next spring.

Delta has shown a remarkable freedom from disease of any kind, and although European foul-brood was reported several times, it was found to be either sac-brood or a false report in every case. Later, in the fall, European foul-brood was found in one apiary in Ladner, and Inspector Finlay and myself spent three weeks in the district without finding another case, so it would appear that this is an isolated one. One other case was found at the extreme east end of Delta, on Tilbury Island, and was treated by destroying all the diseased brood and requeening.

A large number of returned soldiers are taking up bee-keeping in the Fraser Valley, and in almost every case are buying inspected stock and seeking all available information before making a start.

A very considerable number of box hives have been transferred in this district this year, and in one more season all the bees will probably be on movable frames.

The honey-crop in this district has been very good, averaging 50 lb. per colony and totalling about 59 tons. In some districts a yield of 350 lb. per hive was not uncommon, while some bee-keepers reported yields of as much as 400 and 500 lb. from a single colony. One bee-keeper near Cloverdale reports 2,000 lb. from eight colonies. Some of the largest bee-keepers report between 3 and 4 tons, which at 28 cents per pound makes a good return.

All of which is respectfully submitted.

W. H. Turnbull,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, UPPER FRASER AND CHILLIWACK DISTRICT.

A. W. Finlay.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

Sir,—I beg to submit my annual report on the past season's work as Inspector of Apiaries in the Upper Fraser and Chilliwack Districts.

The principal work consisted in the inspection of hives for the purpose of eliminating foul-brood diseases. Some 230 apiaries were examined, containing approximately 1,300 colonies. The district to the north of the Fraser, from Mission to Agassiz, was found to be free from foul-brood, with the exception of one case of the American variety. Sac-brood was, however, found to be very prevalent all through this district, which very possibly is an indication of weakened and run-down stock. Considerable time was given to educational work in this district, so as to impress on the bee-keepers the necessity of requeening with vigorous, pure-bred Italian queens, not only as one of the first principles of better bee-keeping, but as an insurance against foul-brood. The district on the south side of the Fraser, from Abbotsford to Rosedale, was fairly free from disease, only eight cases of European foul-brood and two of American having been found. The usual treatment of dequeening and subsequent requeening in the case of European foul-brood was first of all tried and not found as satisfactory as expected, partly owing to the latter part of the treatment—namely, cell-cutting and requeening—having to be left to the bee-keepers. Later in the season the shaking system, which had proved very efficient in the Lower Fraser District, was adopted here, and the results were entirely satisfactory.

In spite of heavy importations of bee supplies into the Province this year, such as hives, frames, and foundation, these have been very difficult to obtain, the demand being far in excess of the supply. This shortage greatly affects the time taken to clean up diseased colonies, especially with the shaking plan.

Season.

The season opened up early this year with a good honey-flow in this district from maples, dandelion, fruit-bloom, etc. Clover looked very promising early in the season, but cool nights, followed later by a long spell of dry weather, cut off the honey-flow from this source. In districts where fireweed was abundant a fair crop was obtained, but the average was below normal. The total honey-crop produced is greatly in excess of previous years owing to the increase in the number of bee-keepers. Inspection of hives at the close of the season showed

very little winter stores in brood-chambers, and with the difficulty of obtaining sugar for winter feed it is feared that the mortality will be high during the coming winter.

Owing to the seriousness of the foul-brood situation in the Lower Fraser I went to the assistance of Inspector W. H. Turnbull, and worked with him in the Ladner District during the latter part of August and during September.

All of which is respectfully submitted.

ANDREW W. FINLAY,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, GREATER VANCOUVER DISTRICT.

ALEX. KEIR.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

SIR,—I beg to submit herewith my annual report on the past season's work as Inspector of Apiaries for Greater Vancouver District.

During the season 437 visits were made and 1,607 colonies of bees were inspected. Reinspections and inspections for moving bees are not included in the latter total.

Some 373 cases of European foul-brood were found in 116 apiaries, the districts mostly affected being Burquitlam, New Westminster, Burnaby, Marpole, Kerrisdale, and the vicinity of Hastings Park.

Dequeening and the introduction of young Italian queens after a queenless period of twenty-one days was the treatment mostly employed to combat the disease. In the earlier part of the season a good deal of disappointment and some loss was caused through the failure of queen-breeders to forward queens on time.

Many Italian queens for the purpose of requeening diseased colonies and as a prevention against disease have been imported into this district during the year. The introduction of so much new blood ought to help the bee-keeping industry considerably. American foul-brood was found in five apiaries and six colonies of bees were destroyed.

SEASON.

The season started well, with dandelions and fruit-blossoms yielding quite a supply of honey. Natural swarming was of frequent occurrence during the last days of April and first week of May. Colonies which failed to store any surplus honey in May had a hard time in June, when the honey-flow stopped, and they did not build up in time to be able to store any surplus from the main honey-flow. Stimulative feeding during this period would have increased the honey-crop. The average crop of honey is small, the dry spell during the time the fireweed was in bloom and the presence of so much disease being contributing factors. Honey-dew was stored in apiaries at Beaconsfield, Marpole, Point Grey, and North Vancouver City.

West Vancouver and Lochdale Districts were visited, but it was too late in the year for any inspection-work to be done. These districts should have first attention next season.

All of which is respectfully submitted.

ALEX KEIR,
Inspector of Apiaries.

REPORT OF INSPECTOR OF APIARIES, VANCOUVER ISLAND AND GULF ISLANDS.

F. Dundas Todd.

W. J. Sheppard, Esq.,
Chief Inspector of Apiaries, Nelson, B.C.

Sir,—I beg to submit my report as Inspector of Apiaries for Vancouver Island and Gulf Islands for the past season.

On commencing the season's work for 1919, my first duty was to inspect apiaries on the Lower Mainland whose owners purposed selling bees or moving them to new districts. In the course of the month of April three of these special inspections prevented the removal of infected bees into districts which were supposed to be clear of foul-brood. This work done, regular inspection-work was undertaken in Vancouver for two weeks, when the new Inspectors for the Lower Mainland having been appointed, I was transferred to Vancouver Island.

Starting from Victoria, work was continued on the south end of the Island until a call came for a special inspection at Parksville. There three apiaries were found affected with a mild type of European foul-brood, for which there was no accounting, as no bees had been brought into the district for several years. My next visit was to Nanaimo, where American foul-brood had been lingering in one apiary since 1914. One mild case was found, although there had been no signs of it in 1918, and only one mild case in 1917.

The district round Victoria kept me busy until the middle of August, the only interruption being a series of lectures, of a week's duration, on bee-keeping, delivered to the teachers of the Province at the summer school in Victoria. In all, about 170 bee-keepers were found in Victoria and vicinity, being just twice the number of names on the lists of the Department. The largest apiary visited contained twenty colonies.

A rumour that foul-brood was present in the Comox Valley drew me to that district. There I found forty apiaries, all free from disease. I was particularly struck with the great improvement in methods since my first visit in 1911. That year only one bee-keeper produced any honey, but in 1919 I estimated that there were at least 4 tons of surplus honey in the hives. Two days on Denman Island came next; then Alberni District, where I found twenty-five bee-keepers, all on a small scale, practically all beginners.

During the month of September most of the time was devoted to honey-judging at agricultural exhibitions, North Vancouver, Vancouver, Nanaimo, Duncan, and New Westminster being those visited. While at Nanaimo and Duncan opportunity was taken to see as many bee-keepers as possible.

In previous years I had paid short visits to Vancouver Island when reports of disease necessitated such, but this is the first season when systematic work was attempted. The Department lists were rather out of date; consequently much time was lost in visiting people who had ceased to keep bees and in revisiting districts as new names were added. For example, round Victoria forty old names had to be removed, while 120 new names were added.

The number of bee-keepers on Vancouver Island has increased very rapidly in the past two years, and there is call for instruction.

All of which is respectfully submitted.

F. Dundas Todd,
Inspector of Apiaries.

APPENDICES.

APPENDIX No. 1.

TOTAL CORRESPONDENCE RECEIVED AND DISPATCHED BY THE DEPARTMENT OF AGRICULTURE (AT VICTORIA) FOR THE YEARS ENDING DECEMBER 31ST, 1918 AND 1919.

	RECEIVED.		DISPATCHED.	
	1919.	1918.	1919.	1918.
Office of the Deputy Minister—				
General	6,459	5,408	4,123	6,302
Farmers' Institutes	1,563	1,582	1,534	1,451
Women's Institutes	784	992	652	920
Agricultural Associations	527	408	839	534
Secretary, Women's Institutes	422	....	399	....
Statistics Branch	620	....	525	....
Home Economics Branch	....	....	....	....
Horticultural Branch	1,158	1,955	1,440	1,976
Inspection of Imported Fruits Branch	....	613	....	733
Live Stock Branch—				
General	6,247	5,659	6,974	5,509
Soil and Crop Division	340	2,053	517	2,197
Poultry Division	1,926	2,333	3,023	2,804
Dairy Branch	2,113	1,000	2,505	1,300
Publications Branch	1,739	1,005	1,117	768
Totals	23,898	23,008	23,648	24,494

APPENDIX No. 2.

SUMMARY OF APPROPRIATIONS VOTED FOR DEPARTMENT OF AGRICULTURE.

	Fiscal Year 1917-18.	Fiscal Year 1918-19.	Fiscal Year 1919-20.
General—			
Salaries of staff officials	$ 65,752 00	$ 78,184 00	$ 87,344 00
Administration, General Department vote, travelling expenses of officers on duty, and miscellaneous	38,000 00	70,000 00	61,490 00
Agricultural Associations, including grants in aid of prize-lists, judges' expenses, etc.	20,000 00	16,000 00	35,000 00
Exhibition and publicity work	*Nil*	500 00	2,000 00
Institutes, Farmers' and Women's	22,500 00	16,000 00	18,000 00
Horticulture—			
Board of Horticulture, demonstration spraying, control of fruit pests and diseases, etc.; B.C. Fruit-growers' Association grant and inspection of imported fruit, nursery stock, etc.	34,250 00	13,250 00	23,750 00
Live stock—			
Various association grants	.....	5,500 00	7,750 00
Compensation for cattle slaughtered for tuberculosis	27,500 00	20,000 00	33,500 00
Bee-keeping—			
Grant to association and compensation *re* foulbrood in bees	.....	250 00	1,500 00
Noxious weeds, control of	.....	.....	1,000 00
Totals	$208,002 00	$219,684 00	$271,334 00

APPENDIX No. 3.

EXPENDITURE IN AID OF FARMERS' INSTITUTES, YEARS ENDING DECEMBER 31ST, 1918 AND 1919.

	Year 1918.		Year 1919.	
	Total.	Average Cost for 153 Institutes.	Total.	Average Cost for 159 Institutes.
Membership allowances	$4,356 00	$28 40	$4,264 25	$26 81
Competitions—				
Field crop	1,312 24	8 57	45 00	....
Seed production	140 00	....	.....	....
Pure-bred stock supplied	1,590 08	10 39	1,479 79	9 30
Gopher campaign—				
Supplies	454 36	2 96	.....	....
Grants	80 00	....	40 00	....
Stump-pullers	.....	....	96 20	....
Advisory Board expenses	66 90	....	1,611 19	9 47
Agricultural Conference at Smithers	.....	....	1,283 93*	....
District conferences	.....	....	50 00	....
Grants in aid of fairs	200 00	....	100 00	....
Postage, printing, and advertising	894 45	5 84	722 90	4 54
Manure-hopper at Prince Rupert	70 91	....	.....	....
Miscellaneous	143 16	....	90 21	....
Totals	$9,308 10	$60 83	$9,783 47	$61 53

* This represents total vouchers paid, several accounts outstanding at close of year.

APPENDIX No. 4.

EXPENDITURE IN AID OF WOMEN'S INSTITUTES, YEARS ENDING DECEMBER 31ST, 1918 AND 1919.

	1918.		1919.	
	Total.	Average Cost for 62 Institutes.	Total.	Average Cost for 70 Institutes.
Membership allowances	$1,276 50	$20 59	$2,146 25	$30 67
Flower-shows—				
Grants	337 75	5 44	145 25	2 08
Prizes	130 76	2 10	178 08	2 54
Advisory Board—				
Secretary's salary and expenses	665 55	10 73	620 64	8 87
Expenses of members	630 07	10 16	2,567 24	36 67
Lectures	426 70	6 88	433 81	6 20
Conferences and delegates' expenses	508 15	8 20	1,202 21	17 17
Household-science work—				
Salary	.....	....	1,800 00	25 71
Expenses and equipment	.....	....	1,146 27	16 38
Printing and advertising	490 35	7 90	512 25	7 30
Motion-picture films	251 76	....	.....	....
Miscellaneous, including postage	109 16	1 76	161 55	2 31
Federation of Women's Institute, affiliation fee	.....	....	100 00	1 43
Totals	$4,826 75	$77 85	$11,013 55	$157 34

APPENDIX No. 5.

GRANTS TO AGRICULTURAL ASSOCIATIONS, ETC., HOLDING FAIRS, YEAR ENDING DECEMBER 31ST, 1919.

Abbotsford-Sumas Agricultural Association	$ 100 00
Agassiz Agricultural and Horticultural Association	200 00
Alberni Agricultural and Industrial Association	200 00
Aldergrove Agricultural Association	100 00
Armstrong and Spallumcheen Agricultural Society	1,000 00
Arrow Lakes Agricultural and Industrial Association	150 00
Bella Coola Fair and Agricultural Association	50 00
Burquitlam Agricultural Association	150 00
Cariboo Agricultural and Horticultural Association	300 00
Central Park Agricultural Association and Farmers' Institute	150 00
Chilliwack Agricultural Association	750 00
Cobble Hill and District Agricultural Association	100 00
Comox Agricultural and Industrial Association	300 00
Coquitlam Agricultural Society	150 00
Cowichan Agricultural Association	750 00
Cranbrook Agricultural Society	600 00
Creston Valley Agricultural Association	250 00
Delta Agricultural Society	250 00
Elk Valley and Natal Agricultural Association	100 00
Fruitvale Agricultural Association	100 00
Islands Agricultural and Fruit-growers' Association	250 00
Kalamalka Agricultural Association	100 00
Kamloops Agricultural Association	750 00
Kamloops District Stock-breeders' Association	400 00
Kelowna Agricultural and Horticultural Association	500 00
Langley Agricultural Association	200 00
Lasqueti Island Agricultural Association	50 00
Maple Ridge Agricultural Association	200 00
Matsqui Agricultural and Horticultural Association	200 00
Mission Agricultural Association	200 00
Nanaimo Agricultural and Horticultural Association	500 00
Nanoose Agricultural Association	100 00
Needles and District Agricultural Association	150 00
Nelson Agricultural and Industrial Association	500 00
North and South Saanich Agricultural Society	300 00
North Vancouver Horticultural Society	100 00
Northern British Columbia Agricultural and Industrial Association	500 00
Penticton Agricultural and Horticultural Association	250 00
Pritchard Agricultural Association	150 00
Royal Agricultural and Industrial Society	10,000 00
Slocan Lake Agricultural Association	150 00
Smithers Agricultural Association	250 00
Summerland Agricultural Association	350 00
The District of Surrey Agricultural Association	250 00
Trail Fruit Fair Association	250 00
Vancouver Exhibition Association	5,000 00
Windermere District Agricultural Society	250 00
Denman Island Farmers' Institute	60 00
Kaslo Women's Institute	250 00
Pouce Coupe Farmers' Institute	100 00
Metchosin Farmers' and Women's Institute	75 00
Total	$28,135 00
Total, year 1918	$10,850 00

APPENDIX No. 6.

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH.

Date.	Initial and No.	Larvæ.	Pupæ.	Date.	Initial and No.	Larvæ.	Pupæ.
Jan. 27	G.N. 51275	...	...	Sept. 1	N.Y.C. 152342	...	...
„ 27	„ 502292	...	...	„ 1	N.D. 97071	...	...
„ 27	„ 50186	...	...	„ 1	„ 97394	...	...
„ 27	„ 51922	...	...	„ 1	„ 96575	...	...
„ 27	P. & E. 12065	...	...	„ 1	„ 97543	...	...
„ 31	„ 4031	...	...	„ 2	„ 94958	1	...
„ 31	G.N. 50535	...	...	„ 2	„ 95813	3	...
„ 31	„ 50201	...	...	„ 2	„ 95462	...	...
„ 31	„ 50133	...	...	„ 2	„ 96322	...	...
„ 31	P. & E. 2563	...	...	„ 2	„ 95351	...	...
Feb. 3	G.N. 53893	...	...	„ 3	„ 97512	...	...
„ 3	„ 50921	...	...	„ 3	P.R.R. 108749	2	2
„ 3	„ 51708	...	...	„ 3	„ 100674	2	...
„ 7	P.F.E. 3129	...	...	„ 3	Soo Line 151180	...	...
„ 7	C.B. & Q. 39497	...	...	„ 3	C. & E.I. 45332	...	...
„ 7	G.N. 53250	15	...	„ 5	I.C. 57579	...	...
„ 7	„ 253425	5	...	„ 5	„ 59257	...	...
„ 7	„ 53276	...	...	„ 5	N.Y.C. 155907	...	2
„ 7	„ 52988	60	...	„ 5	Soo Line 141704	...	...
„ 7	„ 52376	...	...	„ 5	„ 151208	...	...
„ 11	„ 52196	...	...	„ 5	G.T. 41100	...	...
July 7	U.R.T.C. 1875	...	...	„ 5	N.P. 97315	...	...
Aug. 21	N.P. 97712	...	...	„ 5	„ 97728	...	...
„ 21	„ 94624	...	...	„ 5	„ 95632	...	...
„ 22	I.C. 53690	...	...	„ 5	„ 97732	...	...
„ 22	N.Y.C. 141485	...	...	„ 9	„ 95506	...	2
„ 22	N.P. 94773	1	2	„ 9	„ 95736	...	...
„ 22	L.V. 35002	...	2	„ 9	„ 95597	...	2
„ 23	L. & N. 50022	...	...	„ 9	L. & N. 50050	...	...
„ 23	N.D. 98688	...	...	„ 18	N.P. 98024	1	2
„ 25	G.N. 51560	...	2	„ 18	„ 96986	...	...
„ 25	I.C. 56868	...	...	„ 18	Mich. Cent. 87425	...	...
„ 25	N.D. 95990	...	1	„ 18	L.V. 35179	...	...
„ 25	„ 95865	...	2	„ 18	I.C. 59443	...	...
„ 26	N.P. 96815	...	4	„ 18	P.R.R. 102698	...	...
„ 26	„ 95601	...	...	„ 20	C.N.W. 13716	...	...
„ 26	I.C. 56901	...	...	„ 20	„ 31826	...	...
„ 26	N.D. 94821	...	...	„ 20	Rock Island 66143	...	...
„ 27	I.C. 59277	...	...	„ 20	A.B.C. 201	...	...
„ 27	„ 58184	...	...	„ 20	N.P. 97116	1	...
„ 27	P.R.R. 101973	...	...	„ 22	„ 98451	...	...
„ 27	N.P. 98089	...	...	„ 22	„ 97477	...	...
„ 27	„ 95676	...	...	„ 22	„ 93639	...	...
„ 27	„ 98524	...	2	„ 22	„ 97934	...	...
„ 27	„ 94523	...	...	„ 22	„ 97195	...	...
„ 27	„ 95949	...	...	„ 22	„ 96657	...	...
„ 27	„ 96630	...	...	„ 22	„ 94677	...	...
„ 29	A.B.C. 201	...	...	„ 22	„ 96375	...	...
„ 29	G.T. 46343	...	...	„ 22	„ 95755	...	...
„ 29	P.R.R. 103527	...	...	„ 22	„ 94959	...	...
„ 29	I.C. 59290	...	...	„ 22	I.C. 57046	...	...
„ 29	L. & N. 50190	...	...	„ 22	„ 56747	...	...
„ 30	N.Y.C. 141000	1	2	„ 22	„ 59935	...	...
„ 30	I.C. 58532	...	...	„ 22	G.N. 53154	...	...
„ 30	P.R.R. 102422	3	...	„ 22	„ 52490	...	...
„ 30	N.P. 98872	...	...	„ 25	C.B.A.Q. 36130	...	...
„ 30	„ 95621	...	...	„ 25	G.N. 51945	...	...
„ 30	„ 95331	...	...	„ 25	„ 53634	...	...
„ 30	„ 95706	...	...	„ 25	I.C. 58758	...	...
Sept. 1	I.C. 53719	...	...	„ 25	„ 56761	...	...
„ 1	„ 53156	...	...	„ 25	„ 53860	...	...
„ 1	Lake Erie 61933	...	...	„ 25	A.S.D. 628	...	...

APPENDIX No. 6—*Continued.*

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH—*Continued.*

Date.	Initial and No.	Larvæ.	Pupæ.	Date.	Initial and No.	Larvæ.	Pupæ.
Sept. 27	N.P. 96722	...	...	Oct. 13	P.R.R. 104089	2	...
„ 27	„ 95659	...	...	„ 13	N.Y.C. 151850	...	...
„ 27	„ 94407	...	...	„ 13	„ 144259	...	...
„ 27	„ 95399	...	4	„ 13	„ 145592	...	...
„ 27	I.C. 53860	...	...	„ 13	I.C. 59034	...	...
„ 27	„ 57214	...	...	„ 13	Soo Line 11082	...	...
„ 27	„ 59737	...	...	„ 13	G.N. 53571	...	...
„ 27	„ 58597	...	...	„ 13	„ 50252	...	...
„ 27	„ 53955	...	...	„ 13	„ 53824	...	...
„ 27	G.N. 50141	...	...	„ 13	„ 53033	...	...
„ 27	„ 53225	...	...	„ 13	„ 52764	...	...
„ 27	Soo Line 70042	...	...	„ 13	G.T. 46520	...	...
„ 27	C. & M. 400460	...	...	„ 13	C.G.W. 30194	...	...
„ 29	C.M.&St.P. 400101	...	...	„ 13	I.C. 53051	...	...
„ 29	G.N. 53939	...	1	„ 14	„ 56971	...	...
„ 29	N.P. 96265	...	...	„ 14	N.Y.C. 145801	...	...
Oct. 2	„ 96792	...	...	„ 14	Soo Line 151208	...	...
„ 2	„ 97722	...	...	„ 14	G.N. 52478	...	...
„ 2	G.N. 53662	...	...	„ 14	„ 50217	...	...
„ 2	I.C. 59504	...	...	„ 14	G.T. 41122	2	...
„ 2	„ 58695	2	1	„ 14	„ 41022	...	...
„ 4	„ 59280	...	...	„ 14	„ 46774	...	...
„ 4	G.N. 52346	...	...	„ 14	„ 41171	...	...
„ 6	N.P. 95013	2	1	„ 14	N.P. 97616	...	...
„ 6	C.B. & Q. 36617	3	2	„ 14	„ 97583	...	...
„ 9	N.Y.C. 155564	...	...	„ 14	„ 98551	...	...
„ 9	„ 152342	...	...	„ 14	„ 96827	...	...
„ 9	C.B. & Q. 36144	...	...	„ 14	„ 95764	...	...
„ 9	D.L.W. 6362	4	...	„ 14	P.F.E. 11720	...	...
„ 9	F.R.L. 1070	3	...	„ 14	St. Louis S.L.R.X. 3515	...	...
„ 9	B. & Q. 14677	...	...				
„ 9	C.N.W. 31644	...	...	„ 15	S.F.R.D. 6687	...	...
„ 9	I.C. 58397	...	...	„ 15	N.P. 96084	...	...
„ 10	„ 53156	...	...	„ 15	„ 96025	2	...
„ 10	„ 57616	...	...	„ 15	Lake Erie 61122	...	...
„ 10	„ 57145	...	...	„ 15	G.T. 45053	...	...
„ 10	N.Y.C. 140158	...	...	„ 15	P.R.R. 102130	...	...
„ 10	G.N. 52252	...	...	„ 16	G.N. 53061	...	...
„ 11	N.P. 97949	...	...	„ 16	„ 53340	...	...
„ 11	Lake Erie 62074	...	...	„ 16	„ 51504	...	...
„ 11	P.R.R. 105009	...	...	„ 16	„ 53805	...	...
„ 11	D.L.W. 6227	...	...	„ 16	„ 53339	...	...
„ 12	N.P. 95440	1	...	„ 16	„ 51461	...	...
„ 12	„ 94415	...	...	„ 16	N.P. 94651	...	...
„ 12	„ 98716	2	...	„ 16	„ 95284	2	...
„ 12	I.C. 59617	...	...	„ 16	„ 97589	2	...
„ 12	C.N.W. 30720	...	...	„ 16	„ 97769	...	...
„ 12	G.N. 50901	...	...	„ 16	„ 96010	...	...
„ 12	„ 52872	...	...	„ 16	„ 96804	...	...
„ 12	„ 50224	...	...	„ 16	„ 95700	...	...
„ 12	„ 51381	...	...	„ 16	„ 97105	...	...
„ 12	R.L1 67342	...	...	„ 16	I.C. 57032	...	...
„ 12	P.R.R. 110019	...	...	„ 16	„ 53829	...	...
„ 12	G.T. 41127	...	...	„ 16	„ 58876	...	...
„ 13	N.P. 97661	...	...	„ 16	„ 59581	...	...
„ 13	„ 94736	...	...	„ 16	„ 58313	...	...
„ 13	„ 95534	...	...	„ 16	„ 59651	...	...
„ 13	„ 95346	...	...	„ 16	G.T. 41165	...	...
„ 13	„ 96988	...	...	„ 16	„ 46732	...	...
„ 13	„ 95564	...	...	„ 16	„ 45053	...	...
„ 13	P.R.R. 103204	...	...	„ 16	P.R.R. 104887	...	...
„ 13	„ 105108	...	...	„ 16	„ 103130	...	...
„ 13	„ 100147	...	...	„ 16	C.N.W. 31320	...	...
„ 13	„ 104010	3	...	„ 16	N.Y.C. 151076	...	...

APPENDIX No. 6—*Continued.*

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH—*Continued.*

Date.	Initial and No.	Larvæ.	Pupæ.	Date.	Initial and No.	Larvæ.	Pupæ.
Oct. 16	N.Y.C. 151692	...	...	Oct. 31	S.F.R.D. 3313	...	...
„ 16	Soo Line 151142	...	...	„ 31	C.M. & St. P. 25946	...	...
„ 16	„ 1292	...	...	Nov. 8	N.Y.C. 145478	...	...
„ 16	O.W. 6509	...	...	„ 8	Ann Arbor 9007	...	...
„ 16	N.Y.D.L. 13714	...	...	„ 8	C.M. & St. P. 8094	...	...
„ 17	C.M. & St. P. 26830	...	...	„ 8	P.R.R. 101497	...	...
„ 17	„ „ 29182	...	...	„ 8	G.T. 46635	...	...
„ 17	G.T. 45003	...	...	„ 8	 41136	...	...
„ 18	N.P. 97370	...	...	„ 11	G.N. 52976	...	...
„ 18	„ 95351	...	...	„ 11	Soo Line 11209	...	...
„ 18	„ 97396	...	...	„ 11	F.R. 1058	...	...
„ 18	„ 95822	4	...	„ 11	N.Y.C. 145868	...	...
„ 18	„ 95083	...	...	„ 11	„ 140409	...	...
„ 18	„ 96394	...	...	„ 12	G.N. 53507	...	...
„ 18	G.N. 52488	...	...	„ 12	P.R.R. 101573	...	...
„ 18	„ 53873	...	...	„ 12	N.Y.N.H. 22131	...	...
„ 18	N.Y.D. 4322	...	...	„ 12	G.T. 46116	...	...
„ 18	P.R.R. 104294	...	...	„ 12	„ 40093	...	...
„ 18	„ 101264	...	...	„ 12	N.P. 96110	...	...
„ 18	„ 67031	...	...	„ 12	C.M. & St. P. 26630	...	...
„ 18	C. & E.F. 45123	...	...	„ 13	N.P. 94651	2	...
„ 18	I.C. 53430	...	...	„ 13	„ 94583	2	...
„ 18	„ 53388	...	...	„ 13	C.B.Q. 38357	...	...
„ 18	C. & N.W. 31640	2	...	„ 14	G.N. 53805	...	...
„ 18	L. & N. 50215	...	...	„ 14	I.C. 58875	...	...
„ 18	N.Y.C. 140136	...	...	„ 14	„ 57815	...	...
„ 18	„ 152306	...	...	„ 14	„ 53051	...	...
„ 20	L.N. 50050	...	...	„ 14	N.P. 96184	...	...
„ 20	„ 50068	...	...	„ 14	„ 98756	...	...
„ 20	I.C. 56670	...	...	„ 17	„ 95363	2	...
„ 20	„ 59966	...	...	„ 17	G.N. 51546	3	...
„ 20	„ 57540	...	...	„ 17	 253427	...	...
„ 20	„ 59297	...	...	„ 18	L.V. 35244	...	...
„ 20	„ 57333	...	...	„ 18	N.Y.C. 84836	...	...
„ 20	„ 53776	...	...	„ 18	D.L.W. 6648	...	...
„ 20	„ 57388	...	...	„ 18	N.P. 96010	...	...
„ 20	„ 58798	...	...	„ 18	L.E. 66865	...	...
„ 20	„ 53509	...	...	„ 18	G.T. 40078	...	...
„ 20	C.B. & Q. 36441	2	...	„ 18	„ 41014	...	...
„ 20	S.F.R.D. 12918	...	...	„ 19	I.C. 53101	20	...
„ 20	B. & O. 14232	...	...	„ 19	 57163	...	...
„ 20	N.Y.C. 141448	...	...	„ 19	N.Y.C. 16038	...	...
„ 20	N.P. 95746	...	...	„ 19	„ 84705	...	...
„ 20	„ 94536	...	...	„ 19	G.T. 340154	...	...
„ 20	„ 98329	...	...	„ 19	„ 340035	...	...
„ 20	„ 95470	...	...	„ 21	I.C. 53030	...	...
„ 20	„ 97884	...	...	„ 21	„ 59730	...	...
„ 20	„ 98500	...	...	„ 21	C.R.R. & N.J. 9447	...	...
„ 20	G.N. 53163	...	...	„ 21	C.M. & St. P. 25882	...	...
„ 20	„ 52554	...	...	„ 24	N.P. 96818	...	...
„ 22	„ 253029	...	...	„ 24	„ 99119	...	...
„ 20	„ 53022	...	...	„ 24	G.N. 52222	...	...
„ 20	P.R.R. 105012	...	...	„ 24	„ 53061	...	...
„ 22	N.Y.D. 2640	...	...	„ 24	G.T. 46716	...	...
„ 25	I.C. 59937	...	...	„ 24	 340185	...	...
„ 31	N.P. 98694	...	...	„ 26	C.R. Sx. 219	...	...
„ 31	P.R.R. 104646	5	...	„ 26	G.T. 46503	...	...
„ 31	N.Y.C. 151076	...	...	„ 26	 41290	...	...
„ 31	G.T. 41171	...	...		Total material ..	167	36

APPENDIX No. 6—*Continued.*

FOREIGN CARS INSPECTED IN OKANAGAN DISTRICT IN 1919 FOR CODLING-MOTH—*Continued.*

Total captures—	
Larvæ	167
Pupæ	36
	203
Total cars inspected, 1919	378

Definition of Abbreviations in Car Initials.

G.N.	Great Northern.
N.P.	Northern Pacific.
P.F.E.	Pacific Fruit Express.
C.B. & Q.	Chicago, Burlington & Quincy.
V.R.T.C.	Union Transit Refrigerator Co.
I.C.	Illinois Central.
N.Y.C.	New York Central.
L. & N.	Louisville & Nashville.
L.V.	Lehigh Valley.
P.R.R.	Pennsylvania Railroad.
A.B.C.	
A.S.D.	Atlantic Seaboard Dispatch.
S.L.	Soo Line.
C.M. & St. P.	Chicago, Milwaukee & St. Paul.
D.L.W.	Delaware, Lackawana & Wawanesa.
L.E.	Lake Erie.
G.T.	Grand Trunk.
S.F.R.D.	San Francisco Refrigerator Dispatch.
C.N.W.	Chicago North Western.
C.G.W.	Chicago Great Western.
B. & O.	Burlington & Owaner.
C. & E.I.	Chicago & Eastern Illinois.
N.Y.D.	New York Dispatch.
A.A.	Ann Arbor.
N.Y.N.H.	New York, New Haven.
N.Y.N.J.	New York, New Jersey.

APPENDIX No. 7.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, CORN, ETC., INSPECTED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA.

	1918.	1919.
Apples (boxes)	100,213	24,710
„ (½ boxes)	467	450
„ (bbls.)	2	8
Crab-apples (boxes)	39	70
Pears (boxes)	18,007	32,076
„ (½ boxes)	229	51
Plums (boxes)	11,099	10,965
Prunes (boxes)	515	3,290
Peaches (boxes)	55,665	60,107
Apricots (boxes)	29,296	26,176
Nectarines (boxes)	.....	16
Quince (boxes)	1	47
Cherries (boxes)	6,621	8,140
California oranges (boxes)	65,234	130,382
Japanese oranges (boxes)	99,364	138,141
Chinese oranges (boxes)	169	364
Tangerines (boxes)	65	5
Lemons (boxes)	19,719	23,601
Grapefruit (boxes)	10,052	10,987
Limes (boxes)	2	.....
Pineapples (boxes)	247	816
Pomeloes (boxes)	20	79

APPENDIX No. 7—*Continued.*

MEMORANDUM OF IMPORTED FRUIT, POTATOES, CORN, ETC., INSPECTED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA—*Continued.*

	1918.	1919.
Persimmons (boxes)	.....	269
Pomegranates (boxes)	25	248
Tomatoes (boxes)	3,630	5,955
Peppers (boxes)	241	1,072
Egg-plants (boxes)	15	152
Potatoes (crates)	356	2,132
„ (tons)	8,067	3,838
Sweet potatoes (crates)	3,503	5,262
Yams (crates)	548	940
Taro (crates)	969	1,800
Mango (crates)	.....	2
Rice (tons)	42,630	15,211
Corn (tons)	4,415	5,719
Beans (tons)	3,249	12,885
Peas (tons)	1,737	3,275

APPENDIX No. 8.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT ALL PORTS OF ENTRY IN BRITISH COLUMBIA.

	1918.	1919.
Apples (boxes)	10,512	2,804
„ (½ boxes)	25	46
Crab-apples (boxes)	24	1
Pears (boxes)	7,173	2,613
Plums (boxes)	....	92
Peaches (boxes)	42	1,490
Apricots (boxes)	5	227
Cherries (boxes)	5	166
California oranges (boxes)	....	670
Japanese oranges (boxes)	6	....
Grapefruit (boxes)	....	41
Tomatoes (boxes)	12	30
Sweet potatoes (crates)	1	355
Potatoes (pkg.)	1	....
„ (tons)	....	113
Nutmegs (cases)	191	....
„ (200-lb. sacks)	12	....
Cherry-boxes fumigated	....	1,466

APPENDIX No. 9.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., INSPECTED AT VANCOUVER.

	1918. Tons.	1919. Tons.
121,112 50-lb. sacks rice 114,009 100-lb. „ 550 110-lb. „ 759 180-lb. „ 3,996 200-lb. „ 21,657 224-lb. „ 11,100 50-lb. mats rice	35,919	11,929

APPENDIX No. 9—*Continued.*

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, CORN, ETC., INSPECTED AT VANCOUVER—*Continued.*

	1918. Tons.	1919. Tons.
4,213 50-lb. sacks beans 63 80-lb. „ 27 95-lb. „ 232,392 100-lb. „ 1,500 102-lb. „ 10,103 200-lb. „	3,198	12,815
175 50-lb. sacks peas 1,823 100-lb. „ 2 85-lb. „ 2 120-lb. „ 229 175-lb. „ 1,028 180-lb. „ 19,879 200-lb. „ 9,626 224-lb. „	1,711	3,274
271 100-lb. sacks corn 28,787 180-lb. „ 3,146,259 lb. bulk corn 26,780 lb. popcorn	3,331	4,190
The following were fumigated:—		
325 100-lb. sacks rice	345	16
17 50-lb. sacks beans 51 100-lb. „	59	3
Peas	45	....
9,008 180-lb. sacks corn	....	810
4,675 100-lb. sacks peanuts 20 160-lb. „	613	235
40 bundles empty sacks.		
11,265 empty sacks.		
2 bales corn-husks.		

APPENDIX No. 10.

MEMORANDUM OF IMPORTED RICE, BEANS, PEAS, ETC., INSPECTED AT VICTORIA.

	1918. Tons.	1919. Tons.
Rice	6,711	3,282
Corn	1,083	1,529
Beans	50	70
Peas	25	1
The following were fumigated:—		
Rice	1,232	1,010
Corn	....	75
1,466 cherry-boxes.		
Peanuts	84	....

APPENDIX No. 11.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., INSPECTED AT VANCOUVER.

	1918.	1919.
Apples (boxes)	79,243	19,976
„ (½ boxes)	342	206
Crab-apples (boxes)	25	2
Pears (boxes)	16,153	30,220
„ (½ boxes)	185	50
Plums (boxes)	8,853	8,222
Prunes (boxes)	1	2,921
Peaches (boxes)	42,006	36,160
Apricots (boxes)	26,770	22,097
Quince (boxes)	.....	42
Cherries (boxes)	5,431	6,264
California oranges (boxes)	47,914	94,550
Japanese oranges (boxes)	202,162	291,745
„ (boxes) shipped out	117,495	181,636
Chinese oranges (boxes)	169	364
Tangerines (boxes)	10	5
Lemons (boxes)	14,527	18,151
Grapefruit (boxes)	7,496	9,060
Pineapples (boxes)	165	561
Pomeloes (boxes)	5	.....
Persimmons (boxes)	.....	230
Pomegranates (boxes)	25	173
Tomatoes (boxes)	2,011	4,092
Peppers (boxes)	168	411
Egg-plants (boxes)	12	72
Potatoes (crates)	82	98
„ (bulk and pounds) (tons)	7,942	3,577
Sweet potatoes (crates)	2,703	3,745
Yams (crates)	407	794
Taro (crates)	812	1,717
Mango (crates)	.....	2

APPENDIX No. 12.

MEMORANDUM OF IMPORTED FRUIT, POTATOES, ETC., CONDEMNED AT VANCOUVER.

	1918.	1919.
Apples (boxes)	8,362	2,334
„ (½ boxes)	25	45
Crab-apples (boxes)	24	1
Pears (boxes)	6,833	2,533
Plums (boxes)	....	92
Peaches (boxes)	40	153
Apricots (boxes)	....	95
Cherries (boxes)	....	166
California oranges (boxes)	....	670
Japanese oranges (boxes)	6	....
Tomatoes (boxes)	....	4
Sweet potatoes (boxes)	....	353
Potatoes (pkg.)	1	....
„ (tons)	....	110
Nutmegs (cases)	191	....
„ (lb.)	2,400	....

APPENDIX No. 13.

MEMORANDUM OF IMPORTED NURSERY STOCK INSPECTED AT VANCOUVER.

	1918.	1919.
Standard fruit-trees—		
Apple	33,642	25,968
Crab-apple	1,042	465
Pear	6,347	9,605
Cherry	7,922	6,478
Plum	4,011	3,652
Prune	2,420	4,669
Peach	2,498	4,703
Quince	227	153
Nectarine	73	53
Apricot	5,311	10,489
Fig	31	5
Mulberry	123	59
Nut-trees—		
Walnut	451	277
Filbert	100	48
Chestnut	75	11
Almond	13	14
Seedlings and grafts—		
Fruit seedlings	223,566	238,769
Fruit grafts	41,116	66,270
Small-fruit bushes and plants—		
Grape-vines	3,581	1,409
Currant-bushes	1,247	2,944
Gooseberry-bushes	4,416	6,776
Raspberry-bushes	3,293	13,956
Blackberry-bushes	19,796	16,452
Strawberry-plants	56,674	97,246
Strawberry-plants inspected at Nelson	.....	78,100
Miscellaneous—		
Ornamental trees, etc.	97,887	20,739
Ornamental seedlings	33,550	.....
Ornamental grafts	126,400	87
Rose-bushes	44,332	34,969
Plants (herbaceous)	64,404	26,289
Bulbs and roots	507,936	375,807
Totals	1,292,484	1,046,462

APPENDIX No. 14.

MEMORANDUM OF IMPORTED NURSERY STOCK CONDEMNED AT VANCOUVER.

	1918.	1919.
Standard fruit-trees—		
Apple	1,739	246
Crab-apple	100	22
Pear	238	272
Cherry	56	169
Plum	25	42
Prune	37	13
Peach	7	1,026
Quince	5	3
Nectarine	1	2
Apricot	21	249
Mulberry	19	....

APPENDIX No. 14—*Continued.*

Memorandum of Imported Nursery Stock condemned at Vancouver—*Continued.*

	1918.	1919.
Nut-trees—		
Filbert	2	2
Chestnut	1	....
Seedlings and grafts—		
Fruit seedlings	131	604
Fruit grafts	....	1,947
Small-fruit bushes—		
Grape-vines	614	86
Currant-bushes	36	61
Gooseberry-bushes	421	18
Raspberry-bushes	33	83
Blackberry-bushes	231	223
Miscellaneous—		
Ornamental trees	104	168
Ornamental seedlings	100	....
Rose-bushes (1,110 dead)	1,223	197
Plant	1	....
Bulbs and roots	....	2,509
Totals	5,145	7,942

APPENDIX No. 15.

Memorandum of Vegetables, Fruit, Nuts, etc., for which no Certificates were issued.

	1918. Crates.	1919. Crates.
Artichokes	83	71
Asparagus	2,057	1,250
Green beans	60	64
Beets	198	7
Cabbage	5,568	2,612
Cantaloupes	8,554	11,733
Carrots	2,002	3,839
Casabas	366	3,050
Cauliflower	3,903	3,180
Celery	2,259	493
Corn	121	55
Cucumbers	676	1,032
Garlic	6	73
Horse-radish	4	11
Lettuce	8,223	7,783
Melons	6,949	7,110
Onions	12,566	10,282
Parsley	52	135
Green peas	240	195
Radish	103	158
Rhubarb	2,864	2,347
Spinach	153	67
Sprouts	28	116
Squash	300	385
Turnips	482	12
Vegetables	63	42
Seed (miscellaneous)	....	3,024

APPENDIX No. 15—*Continued.*

MEMORANDUM OF VEGETABLES, FRUIT, NUTS, ETC., FOR WHICH NO CERTIFICATES WERE ISSUED—*Continued.*

	1918. Crates.	1919. Crates.
Watermelons	....	58,672
Bananas (bunches)	29,672	49,622
Gooseberries	31	26
Grapes	20,510	34,301
Cranberries	147	367
Loganberries	6	10
Raspberries	68	35
Strawberries (207 condemned)	5,483	10,931
Almonds	420	8,710
Brazil nuts	....	4,282
Chestnuts	2	207
Cocoanuts	....	142
Peanuts	30,709	11,388
Walnuts	900	14,147

APPENDIX No. 16.

TESTING FOR TUBERCULOSIS IN CATTLE.

District.	Premises visited.	Cattle tested.	Reactors.
Agassiz	73	685	10
Alberni	1	1	1
Aldergrove	3	44	..
Blaings	10	23	..
Bowen Island	5	18	..
Burns Lake	1	10	..
Burnaby	10	19	1
Cassidy	2	34	3
Cedar	5	40	1
Chemainus	22	66	..
Chilliwack	129	1,454	24
Cobble Hill	19	130	5
Courtenay	3	93	..
Duncan	264	1,343	46
Denman Island	29	214	..
Dewdney	8	170	2
Essondale	1	220	..
Gibson Heights	21	40	..
Glen Valley	1	16	..
Francois Lake	1	8	..
Hammond	1	73	..
Hillbank	2	27	..
Kamloops	6	75	3*
Kingcome Inlet	3	49	..
Ladner	28	367	34
Langley	77	563	18
Ladysmith	33	54	3
Lulu Island	185	1,687	75
Matsqui	29	396	4
Moresby Island	1	36	..
Mission	3	63	3
North Bend	5	27	1
North Vancouver	55	245	20
Pemberton	3	15	3
Pender Island	16	89	..

* One quarantined.

APPENDIX No. 16—*Continued.*

Testing for Tuberculosis in Cattle—*Continued.*

District.	Premises visited.	Cattle tested.	Reactors.
Pitt Meadows	4	19	3
Point Grey	24	105	9†
Prince Rupert	2	60	..
Queen Charlotte Islands	13	46	..
Saltair	11	56	7
Saanich	224	1,538	77
South Vancouver	88	212	15*
Sea Island	8	50	9
Sechelt	3	13	1
Smithers	6	30	..
Sooke	6	14	1
Surrey	34	507	72‡
Sumas	110	1,117	19
Vancouver	128	354	2
Vanderhoof	7	41	..
Victoria	72	249	26
Webster's Corners	1	1	..
Westminster	13	140	1
West Vancouver	1	2	..
Yale	1	5	..
Armstrong	65	280	..
Burton City	2	15	..
Black Pines	1	2	..
Creston	2	16	..
Crescent Valley	4	166	11
Chase	14	32	..
Clinton	1	1	..
Celista	11	20	..
Castledale	2	3	..
Commonage	1	1	..
Duck Creek	1	1	..
Erickson	1	1	..
Edgewood	1	11	..
Ewings	1	1	..
Golden	31	131	2
Glenrosa	1	1	..
Hefferly Creek	1	5	..
Nob Hill	1	1	..
Kaslo	1	1	..
Larkin	1	10	..
Mons	1	1	..
McDonald Landing	3	32	..
Notch Hill	14	52	..
Nelson	40	185	29
Nicholson	2	5	..
Okanagan Landing	2	25	..
Oyama	3	6	2
Penticton	3	12	..
Peachland	1	1	..
Revelstoke	3	38	..
Shuswap	1	8	..
Summerland	1	8	..
Sicamous	2	12	..
Salmon Arm	31	162	2
South Vernon	1	1	..
Tranquille	1	42	1
Vernon	4	4	..
Westbank	2	4	..
Woods Lake	1	1	..
Keremeos	1	1	..
Kelowna	8	88	2

* One quarantined. † Four quarantined. ‡ Five quarantined.

APPENDIX No. 17.

EIGHTH INTERNATIONAL EGG-LAYING CONTEST.

The Eighth International Egg-laying Contest was held under the auspices of the Poultry Division, Provincial Department of Agriculture, at the Exhibition Grounds, Victoria, B.C., from October 15th, 1918, to September 14th, 1919, a period of eleven months. The total number of eggs laid is as follows:—

Pen No.	Name and Address.	Breed.	No. of Eggs.
	Class 1.—Light-weight Varieties (Six Birds to a Pen).		
15	M. H. Ruttledge, Sardis, B.C. (first prize, $50) ...	White Leghorns	1,274
5	T. W. Palmer, R.M.D. 4, Victoria, B.C. (second prize, $25, and silver medal for heaviest winter egg yield)	„	1,221
19*	E. J. White, Kerrisdale P.O., B.C.	„	1,184
16	W. M. Alcorn, Port Hammond, B.C. (third prize, $10)	„	1,131
2	D. Edwards, Somenos, B.C. (fourth prize, *Canadian Poultry Review* bronze medal)	„	1,115
6	H. W. Tripp, Ganges Harbour, B.C.	„	1,111
11	J. A. Hanson, Corvallis, Oregon, U.S.A.	„	1,098
4	Norie Bros., Cowichan, B.C.	„	1,091
14*	W. and F. Tozer, Milner, B.C.	„	1,084
20	C. G. Golding, Qualicum Beach, B.C.	„	1,076
13	H. A. Ismay, Box 117, Victoria, B.C.	„	1,059
17	H. A. Hincks, Langford, B.C.	„	1,055
12	F. E. Pullen, Whonnock, B.C.	Mottled Anconas	1,002
18	J. J. Dougan, Cobble Hill, B.C.	White Leghorns	958
7*	A. Unsworth, R.R. 1, Sardis, B.C.	„	914
3	W. E. Senior, McPherson Avenue, Victoria, B.C. ..	„	913
21*	Oregon Agricultural College, Corvallis, Ore., U.S.A.	„	878
9	W. Bradley, Langford, B.C.	„	835
1	J. Thackeray, R.R. 2, Chilliwack, B.C.	„	828
10	G. O. Pooley, Duncan, B.C.	„	811
8*	J. E. Joyce, Pembroke Street, Victoria, B.C.	„	778
	Total	.....	21,416
	Class 2.—Heavy-weight Varieties (Six Birds to a Pen).		
28	J. S. Baiss, Cobble Hill, B.C. (first prize, $50) ...	White Wyandottes	1,114
37	Dean Bros., Keating, B.C. (second prize, $25, and silver medal for heaviest winter laying)	„	1,110
36	A. W. Cooke, Kelowna, B.C. (third prize, $10) ...	„	996
27	G. D. Adams, R.R. 1, Langley Prairie, B.C. (fourth prize, *Canadian Poultry Review* bronze medal)	„	968
35	S. S. F. Blackman, R.R., Sidney, B.C.	Single Comb Reds	948
22	T. Bridge, Dundas Street, Vancouver, B.C.	White Wyandottes	935
26	E. K. Merkley, 206 49th Avenue E., Vancouver, B.C.	Single Comb Reds	928
40	W. H. Catterall, Mount Tolmie, B.C.	White Wyandottes	873
29*	M. S. Stephens, Courtenay, B.C.	Barred Rocks	865
23*	C. G. Golding, Qualicum Beach, B.C.	„	862
30	G. Watson, Gordon Head, B.C.	White Wyandottes	830
33*	State College, New Mexico, U.S.A.	„	802
38	Mrs. L. Feast, 209 19th Avenue W., Vancouver, B.C.	„	797
34	E. D. Read, Duncan, B.C.	„	788
39	B.C. Red Club (D. Nicol, Secretary), Victoria, B.C.	Single Comb Reds	785
32	T. Cheshire, 103rd Street, Edmonton, Alta.	White Wyandottes	757
31	J. Dickson, Atchelitz, B.C.	Barred Rocks	752
25	W. H. Willins, Stannard Avenue, Victoria, B.C. ...	Rose Comb Reds	741
24	A. F. Atkinson, Box 181, Nelson, B.C.	White Wyandottes	703
	Total	.....	16,554

* Eggs under weight.

B.C.P.A. diploma and badge winners: Class 1, Pens 15, 6, and 19; Class 2, Pens 28, 33, and 26.

APPENDIX No. 18.

Summary of Results, Eighth International Egg-laying Contest, Victoria, B.C.

Duration of contest (months)	11
Number of pens	40
Number of birds	240
Total number of eggs laid	37,970
Total value of eggs laid	$1,906.41
Total cost of feeding	$823.72
Profit over cost of feeding	$1,082.69
Average market price of eggs per dozen	.60¼
Average cost to produce dozen eggs	.26
Average number of eggs laid per pen	949.25
Average number of eggs laid per bird	158.2
Average cost of food per pen (six birds)	$20.59
Average cost of food per bird	$3.43
Profit over cost of food per pen	$27.06
Profit over cost of food per bird	$4.51
Eggs laid by winning pen, Class 1	1,274
Average per bird, winning pen	212.3
Eggs laid by winning pen, Class 2	1,114
Average per bird, winning pen	185.6

APPENDIX No. 19.

British Columbia Poultry Association—Executive for 1920 and Directors for 1920-21.

President: A. H. Anderson. *Vice-President:* R. Wilson.

Executive:

Rev. C. McDiarmid. A. H. Turvey. R. H. Baird. H. E. Waby.

Directors:

Arrow Lakes	R. H. Baird.
Central Park	J. Thurston.
Chilliwack	A. H. Turvey.
Cobble Hill	G. Bonner.
Cowichan	J. J. Dougan.
Cranbrook	W. Harvey.
Fernie	J. Clark.
Grand Forks	T. Bowen.
Kamloops	J. H. Wilson.
Kelowna	D. Enniss.
Langford	W. Bradley.
Maple Ridge	A. H. Anderson.
Mission City	Rev. C. McDiarmid.
New Denver	B. Parkinson.
Northern Okanagan	R. Arnott.
North Vancouver	F. Kasel.
Penticton	R. F. Dynes.
Point Grey	D. R. Hall.
Summerland	W. Beattie.
Trail	J. Wadsworth.
Vernon	
Victoria	M. Blackstock.
Vancouver	R. Wilson.
West Kootenay	G. Horstead.
Clayburn	W. J. Dwyer.
Corbin	S. Knight.
Salmon Arm	H. E. Waby.

Sec.-Treas.: J. R. Terry. *Assistant Secretary:* H. E. Upton. *Auditor:* F. W. Laing.

APPENDIX No. 20.

TABLE OF CULLING DEMONSTRATIONS HELD DURING THE PERIOD OF MARCH 1ST, 1919, TO DECEMBER 31ST, 1919.

Name and District.	No. of Birds handled (Young and Old Stock).	No. culled.
R. T., Burnaby Lake	670	167
T. M., Burnaby	1,210	251
C. M., Hammond	1,140	75
S., New Westminster	250	50
——, Clayburn	250	100
C., South Vancouver	300	25
R. Mc., Haney	350	160
L., Burnaby	600	200
P., Hammond	350	25
W. S., Chilliwack	2,600	350
R., Chilliwack	1,000	160
B., Chilliwack	1,800	300
S., Burnaby	500	200
P., Eburne	150	50
A. N., Eburne	700	180
M., New Westminster	120	50
M., New Westminster	100	60
Totals	12,090	2,403

APPENDIX No. 21.

TABLE OF DISEASE CASES ATTENDED DURING THE PERIOD MARCH 1ST, 1919, TO DECEMBER 31ST, 1919.

Disease.	No. of Cases.
Colds	10
Diphtheritic roup	5
Liver trouble	1
Catarrhal roup	2
Pneumonia	2
Rheumatism	1
Coccidiosis	8
Worms	4
Poisoning	1
Leg-weakness	2
Ovarian trouble	2
Sterility	2
Apoplexy	1
Various other troubles	45

Vaccinations—2,820 birds vaccinated, 4,640 doses.

APPENDIX No. 22.

Statement of Receipts and Expenditures, Kamloops Bull-sale, March 26th, 1919.

Receipts.

By	Commission on sale at 3 per cent. on $16,430	$ 492 90
	Shipping fee at 75 cents per head (6)	4 50
	Freight collected	236 00
	Exchange received on cheques	6 70
	Advertisements in catalogue	127 50
	Feed supplied to stock	82 50
	Entry fees on stock	244 00
	Membership fees to B.C.S.B.A., 1919 (36)	37 00
	Rebate, C.N.R. overcharge on Prairie stock	2 00
		$1,233 10

Expenditures.

To	Freight on bulls	$ 356 27
	Advertising in papers and posters	109 65
	Catalogue for sale	60 00
	Carpenter's work and material on sheds	54 50
	Labour	86 40
	Straw for sheds	10 00
	Sawdust for sheds	4 00
	Water for stock	10 00
	Tags for bulls	4 50
	Crate for bull expressed	7 20
	Cartage on bull expressed	5 00
	Feed for stock	82 50
	Auctioneers (2)	250 00
	Postage	5 00
	Incidentals	1 55
	Telegrams	6 64
	Exchange to bank on cheques	13 75
	Membership fees to head office, Victoria (36)	36 00
	Rebate of membership fee (Fowler)	1 00
	Rebate of advertising (Fowler)	5 00
	Rebate of entry fees (Fowler)	42 00
	Costs of injury to R. Cahilty's horse	68 61
	Balance to credit in bank	13 53
		$1,233 10

Note.—To this balance on hand should be added a rebate to come from the C.P.R. of half-freight on animal from Salmon Arm, B.C. (freight $13.35).

APPENDIX No. 23.

STATEMENT OF RECEIPTS AND EXPENDITURES, ARMSTRONG SALE, SEPTEMBER 26TH, 1919.

Receipts.

By	Stock sold (31 sheep and 2 pigs)	$1,465 00
	Entry fees	63 75
	Membership fees to B.C.S.B.A.	6 00
	Commission of 3 per cent. on sales	46 88
	Freight	23 75
	Advertising in catalogue	65 50
	Exchange received on cheques	1 25
	Crate	4 00
		$1,676 13

Expenditures.

To	Stock purchased (31 sheep and 2 pigs)	$1,464 50
	Advertising	93 70
	Catalogue	69 50
	Freight	14 15
	Crates	8 00
	Membership fees to B.C.S.B.A., Victoria	6 00
	Rebate of fees (Western Stock Ranches)	6 85
	Disbursements	3 07
	Bank exchange	2 25
	Cash on hand	8 11
		$1,676 13

APPENDIX No. 24.

QUILCHENA DRY FARM, SHEEP STATEMENT, DECEMBER 31ST, 1918.

Sheep on Farm, December 31st, 1918.

	Value.
4 pure-bred rams at $50	$ 200 00
100 ewes at $20	2,000 00
25 ewes at $19	475 00
13 ewes at $12	156 00
	$2,831 00

(Seven head of ewes died during the winter.)

APPENDIX No. 24—*Continued.*

QUILCHENA DRY FARM, SHEEP STATEMENT, DECEMBER 31ST, 1918—*Continued.*

Sheep and Wool sold since December 31st, 1918.

			Returns.
April	17.	Sold wool to Interior of B.C. Wool-growers	$ 7 53
July	8.	„ „ „ „ „	357 53
„	8.	„ sheep-pelts „ „ „	35 15
June	16.	„ 16 ewes, 2,080 lb. at 13c.	270 00
Sept.	16.	„ 15 lambs, 1,215 lb. at 15c.	182 25
„	18.	„ 1 Oxford ram at $45	45 00
„	18.	„ 2 ewes at $23	46 00
„	18.	„ 10 ewes at $17.50	175 00
„	18.	„ 1 lamb at $26	26 00
„	18.	„ 1 lamb at $16	16 00
„	18.	„ 1 ewe at $3	3 00
„	18.	„ 32 ewes at $15	480 00
„	18.	„ 46 lambs, 3,680 lb. at 13½c.	496 80
„	27.	„ 1 Shropshire ram at $50	50 00
Oct.	1.	„ 1 Shropshire ram at $50	50 00
Nov.	1.	„ 1 lamb at $6	6 00
Dec.	1.	„ 1 lamb at $10	10 00
			$2,256 66

Sheep on Farm, December 31st, 1919.

	Value.
2 pure-bred Oxford Down rams at $100	$ 200 00
1 „ Cheviot ram at $40	40 00
66 mature ewes at $20	1,320 00
51 ewe lambs at $15	765 00
	$2,325 00

STOCK AND EQUIPMENT ON QUILCHENA DRY-FARMING STATION, DECEMBER 31ST, 1919.

Live stock—
- 1 aged mare.
- 2 mares, 10 years old.
- 1 mare, 6 years old.
- 1 gelding, 3 years old.
- 1 gelding, 5 years old.
- 2 mares, 2 years old.
- 1 cow, 7 years old.
- 1 heifer, 3 years old.
- 3 spring calves.
- 1 spring colt (gelding).
- 3 rams.
- 56 ewes.
- 51 ewe lambs.
- 18 chickens.

Harness, etc.—
- 2 sets heavy harness.
- 1 set new heavy harness.
- 1 stock-saddle.

Implements—
- 1 heavy wagon, 4-inch tire and box.
- 1 set bob-sleighs.
- 1 6-foot Massey-Harris binder.
- 1 I.H.C. land-packer, 2,000 lb.
- 1 Massey-Harris 11-shoe drill.
- 1 disk harrow.
- 1 set drag-harrows, 3-section lever.
- 1 McCormick 10-foot rake.
- 1 Verity combination plough.
- 1 Planet horse-hoe.
- 1 Oliver plough.
- 1 grindstone.
- 1 No. 25 Planet garden-seeder.
- 1 Chatham fanning-mill.
- 1 set farm scales, capacity 2,000 lb.
- 1 new mower, Emerson.
- 2 4-inch x 6-foot hotbed-sashes.
- 1 chop-mill.

Horseshoeing outfit—
- 1 hammer.
- 2 pairs pincers.
- 1 paring-knife.
- 1 rasp.

Blacksmith's outfit—
- 1 Chicago portable forge.
- 1 anvil.
- 1 hammer.
- 1 pair tongs.

APPENDIX No. 24—*Continued.*

STOCK AND EQUIPMENT ON QUILCHENA DRY-FARMING STATION, DECEMBER 31ST, 1919—*Continued.*

Hand-tools—
- 1 scoop shovel.
- 2 long-handled shovels.
- 1 short-handled shovel.
- 1 spade.
- 2 stable-forks.
- 3 hay-forks.
- 1 pinch-bar.
- 1 bar-stud.
- 2 picks.
- 1 steel hammer.
- 1 splitting-maul.
- 3 wedges.
- 2 axes.
- 1 5-foot lance-toothed saw.
- 1 fence-wire stretcher.
- 1 logging-chain.
- 1 peavey.

Carpenter's tools—
- 1 hand-saw.
- 1 steel square.
- 1 set brace and bits.
- 1 hammer.
- 2 chisels.
- 1 spirit-level.

Buildings—
- 1 granary, 14 x 26 feet x 8-foot wall.
- 1 stable, 20 x 40 feet x 7-foot wall.
- 1 bunk-house, 12 x 12 feet x 8-foot wall.
- 1 cabin (2 rooms), 12 x 10 feet and 10 x 12 x 6-foot wall.
- 1 tent, 12 x 16 feet.
- 1 tent, 14 x 16 feet, with flies.
- 1 sheep-shed, 20 x 40 x 7 feet.
- 1 sheep-shed, 22 x 42 feet, straw roof.
- 1 stationary feed-rack, 130 feet, with trough.
- 1 root-cellar, 12 x 24 feet.
- 1 sheep-corral.

Household effects—
- 1 Rowena range (new).
- 1 three-quarters bed, springs, and mattress.
- 2 camp-cots.
- 2 pairs blankets.
- 2 pillows.
- 4 kitchen chairs.
- 1 wash-tub.
- 1 wash-boiler.
- Pots, pans, etc.
- 1 heating-stove (box).

Miscellaneous—
- 1 10-foot pump.
- 1 barrel.
- 2 water-tubs.
- 2 lanterns.
- 1 Greener double-barrel 10-gauge shotgu

Fencing—
- Fences erected, 580 rods.
- Fence-wire, 900 rods (woven).
- „ 79 „ „
- „ 48 „ „
- „ 400 „ (barbed).
- One extra wire put on 2 miles of fence.

Hay and feed—
- 1 stack green hay, 20 tons.
- 2 „ „ 6 „
- 10 acres fall wheat.
- 10 „ fall rye.
- 2 stacks barley-sheaves (unthreshed).
- 3 „ oat-sheaves (unthreshed).
- 2 „ wheat-sheaves (unthreshed).
- 1 „ rye-sheaves (unthreshed).
- 2 loads peas.

Roots—
- Turnips, 8 tons.
- Carrots.
- Sugar-beets, ½ ton.
- Potatoes, ½ ton.

Weather-observation instruments—
- 1 wet- and dry-bulb thermometer.
- 1 minimum thermometer.
- 1 maximum thermometer.
- 1 rain-gauge.
- 1 screen.

APPENDIX No. 25.

INVENTORY OF EQUIPMENT AT 105-MILE DRY-FARMING STATION, DECEMBER 31ST, 1919.

Live stock—
- 1 gelding, 9 years old.
- 1 mare, 5 years old.
- 1 mare, 11 years old.
- 1 colt, 19 months old.

Buildings—
- 1 cottage, 20 x 24 feet.
- 1 stable, 18 x 36 feet.
- 1 lean-to stable, 13 x 18 feet.
- 1 implement-shed, 15 x 50 feet.

APPENDIX No. 25—*Continued.*

Inventory of Equipment at 105-Mile Dry-farming Station—*Continued.*

Buildings—*Continued.*

1 granary, 20 x 24 feet.
2 frame granaries, 8 x 10 feet.
1 chicken-house, 11 x 14 feet.
1 stock-shed, 16 x 32 feet.
1 wood-shed, 12 x 15 feet.
1 root-cellar.
2 corrals.
3 stack-yards.
2,426 yards barb-wire fence, 4 wires high.
816 „ „ 5 „
1,550 „ „ 3 „
1,320 yards woven-wire fence, 3 barb wires on top.
280 yards woven-wire fence, 3 barb wires on top.
390 yards woven-wire fence, 1 barb wire on top.
260 yards woven-wire fence, 1 barb wire on top and 1 between.
400 yards woven-wire fence.
2,550 pickets, woven into woven-wire fence, 2 feet apart.
600 yards Virginia-lock S. and R. fence, 6½ feet high.
540 yards Russell fence, 6 feet high.

Machinery—

1 6-foot binder with truck and transport truck.
1 grain-cradle.
1 5-foot mower.
1 9-foot rake.
1 single-disk drill.
1 packer.
1 3-section harrow with 2 draw-bars.
1 disk harrow with truck.
1 Oliver sulkey plough, with 2 bottoms and 3 shares.
1 Planet Jr. cultivator.
1 Planet Jr. cultivator and seeder (garden).
1 hand-cultivator.
1 3¼-inch wagon.
1 set 2-inch sleighs.
2 hay-racks.
1 set scales, capacity 240 lb.

Tools—

1 hoe.
2 spades.
2 shovels.
1 wheelbarrow.
6 forks (5 hay and 1 manure).
1 watering-can.
1 wire-stretcher with 30 feet of rope.
4 axes (3 chopping and 1 bench).
100 feet ¾-inch rope.
4 wrenches.
2 pairs pliers.
1 crowbar.
1 pick.
2 ladders.
1 rasp.
1 log-chain.
1 comb and brush (stable).
2 blast-lanterns.
1 pump.
1 well.
1 branding-iron.
1 8-lb. sledge-hammer.
1 iron wedge and set of dogs.
1 grindstone and fixtures.
2 watering-troughs.
2 feed-troughs.
1 stone-boat.

Carpenter's tools—

1 brace and set of bits.
1 auger, 1½ inches.
1 5-foot saw.
1 hand-saw.
1 rip-saw.
1 draw-knife.
2 hammers.
1 steel square.
1 tape measure.

Grain and hay—

10 tons hay.
3 tons straw.
1,200 lb. rye.
6,000 lb. oats.
3,100 lb. wheat.

Furniture—

1 cook-stove.
1 heater.
1 bed with springs and mattress.

Weather instruments—

1 thermometer, maximum.
1 „ minimum.
1 „ maximum and minimun
1 hygrometer with glass and measuring
1 rain-gauge.

Miscellaneous—

2 mail-bags with locks.
15 lb. binder-twine, oil, nails, stock-salt.
100 grain-sacks.
2 sets harness.
7 halters (old).
1 scythe and snath.

APPENDIX No. 26.

COW-TESTING ASSOCIATIONS IN BRITISH COLUMBIA.

Name.	Instituted.	Secretary.	Supervisor.
Chilliwack	March 17, 1913	Wm. Dusterhoeft, Chilliwack	J. A. Munn, Sardis.
Comox	April 23, 1914	J. Pritchard, Comox	T. Menzies, Courtenay.
Langley-Surrey	June 8, 1914	H. S. Berry, Langley Prairie	Wm. Egerton, Langley Prairie.
Delta	April 12, 1915	W. N. Townsend, Ladner	G. H. Candy, Ladner.
Richmond	March, 1919	G. E. C. Hooper, Eburne P.O.	E. G. Wozencroft, Eburne P.O.
Dewdney	August 30, 1919	Thos. Brearley, Dewdney	A. S. Rankin, Mission.

APPENDIX No. 27.

AVERAGE YIELDS IN DIFFERENT ASSOCIATIONS SINCE 1914.

	1914.		1915.		1916.		1917.		1918.	
	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.	Milk.	Fat.
	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.	Lb.
Chilliwack	6,706	278	7,152	297.6	7,693	314.5	7,482	303.4	6,487	266.7
Comox	....	...	4,950	231.3	5,044	229.7	5,958	280.7	6,193	303.6
Langley-Surrey	....	...	6,553	241.6	6,847	267.7	6,798	258.4	6,660	252.5
Delta	....	...	....	....	6,448	247.9	6,805	269.4	7,866	296.4

APPENDIX No. 28.

LIST OF CREAMERIES, CONDENSERIES, AND CHEESE-FACTORIES IN BRITISH COLUMBIA, 1919.

Name.	Manager or Secretary.	P.O. Address.
Burns, P., & Co., Ltd.	M. R. Silver	Woodland Drive, Vancouver.
Comox Creamery Association	R. U. Hurford	Courtenay.
Cowichan Creamery Association	W. Paterson	Duncan.
Curlew Creamery Co.	R. E. Jenne	Grand Forks.
" "	Geo. Smith	Nelson.
Clayburn Creamery	Cooper & Seldon	Clayburn.
Fraser Valley Milk Producers' Ass'n.	E. G. Sherwood	1170 Hornby Street, Vancouver.
Chilliwack Creamery	W. K. McLeod	Chilliwack.
Fraser Valley Dairies, Ltd.	G. O. Clark	405 Eighth Ave. W., Vancouver.
Hefferly Creek Creamery	Thos. Bunting	Hefferly Creek.
Kamloops District Creamery Ass'n.	W. Van der Wall	Kamloops.
Kelowna Creamery Co., Ltd.	W. G. Benson	Kelowna.
Meadowbrook Creamery Co.	A. P. Slade	199 Water Street, Vancouver.
Nanaimo Creamery Association	Jos. Randle	Nanaimo.
Northwestern Creamery, Ltd.	Norton & Snelling	Victoria.
Northern Okanagan Creamery Ass'n.	A. E. Sage	Armstrong.
New Westminster Creamery Society, Ltd.	D. E. Mackenzie	New Westminster.
Revelstoke Creamery Co., Ltd.	J. E. Carman	Revelstoke.
Royal Dairy Co.	W. C. McAllister	1110 Douglas Street, Victoria.
Saltspring Island Creamery Ass'n.	A. W. Drake	Ganges.
Salmon Arm Creamery Association	R. Karnagel	Salmon Arm.
Spencer, David, Ltd.	D. W. Matheson	Vancouver. [Vancouver.
Turner's Dairy, Ltd.	F. Turner	Seventeenth Ave. and Ontario St.,
Vancouver Creamery Co., Ltd.	J. M. Livingstone	15 Alexander Street, Vancouver.
Vernon Creamery	H. W. Knight	Vernon.
Condensers.		
The Borden Milk Co., Ltd.	L. Chevalley	Sardis.
Courtenay Milk Condensing Co., Ltd.	E. G. Emery	Courtenay.
Pacific Milk Co., Ltd.		Ladner.

APPENDIX No. 28—*Continued.*

LIST OF CREAMERIES, CONDENSERIES, AND CHEESE-FACTORIES IN BRITISH COLUMBIA IN 1919—*Continued.*

Name.	Manager or Secretary.	Address.
Cheese-factories.		
Fraser Valley Milk Producers' Ass'n.	E. Haggarty	Sardis.
" " "	M. Valentin	Clayburn.
Ferrara Cheese Manufacturing Co. ...	A. G. Ferrara	Chilliwack.
Revelstoke Creamery Co., Ltd.	J. E. Carman	Revelstoke.

APPENDIX No. 29.

MILK-TESTERS LICENSED UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919.

Name.	Address.
Barker, B. S.	509 Twenty-ninth Avenue East, Vancouver.
Bates, Herbert F.	Sardis.
Batey, Herbert S.	1170 Hornby Street, Vancouver.
Brooks, Frank	1938 Second Avenue West, Vancouver.
Bunting, Thomas	Hefferly Creek.
Burmeister, J.	Sixth Avenue and Sixth Street, New Westmin-
Calder, Jas.	882 Hamilton Street, Vancouver. [ster.
Campbell, Andrew M.	Webster's Corners.
Carman, J. E.	Revelstoke.
Carradice, F. W.	Sixth Avenue and Sixth Street, New Westmin-
Carroll, W. J.	Courtenay. [ster.
Carter, Jas. N.	Seventeenth Avenue and Ontario Street, Van-
Chevalley, Frank	Sardis. [couver.
Clarke, F. J.	850 Fourteenth Avenue West, Vancouver.
Craig, John	930 North Park Street, Victoria.
Douglas, D. K.	327 Seventh Avenue, Vancouver.
Dudman, Alfred	199 Water Street, Vancouver.
Dunn, J. S.	Nanaimo.
Egerton, Wm.	R.M.D. No. 4, Victoria.
Emery, E. G.	Courtenay.
Fish, James	2469 Oxford Street, Vancouver.
George, H. H. S.	Kamloops.
Hall, F. D. B.	Chilliwack.
Hanson, H. M.	Matsqui.
Hooper, Wm. J.	1001 Pender Street West, Vancouver.
Iwanami, J.	1111 Fort Street, Victoria.
James, David A.	1225 Eleventh Avenue West, Vancouver.
Jenne, R. Everett	Grand Forks.
Johnson, Alf.	Vernon Creamery, Vernon.
Karnagek, R.	Salmon Arm.
Kell, Geo.	New Westminster.
Lewarne, Alf.	Essondale.
Lewarne, A. E.	400 Pender Street East, Vancouver.
Livingstone, John M.	23 Alexander Street, Vancouver.
McAllister, W. C.	Douglas Street, Victoria.
Mackenzie, H. H.	New Westminster.
MacLeod, W. K.	Chilliwack.
Magar, John A.	Sardis.
Matheson, D. W.	Care Spencer's, Limited, Vancouver.
Metcalfe, John F.	Oak Street, Vancouver.
Munn, J. H.	Sardis.

APPENDIX No. 29—*Continued.*

MILK-TESTERS LICENSED UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919—*Continued.*

Name.	Address.
Naud, Daniel	930 North Park Street, Victoria.
Nelson, Chas. E.	2144 Twelfth Avenue West, Vancouver.
Norton, F. H. A.	1311 Broad Street, Victoria.
Rive, Chas.	2226 Twelfth Avenue West, Vancouver.
Rive, Elias	2226 Twelfth Avenue West, Vancouver.
Russell, Geo. F.	Courtenay.
Sackville, Miss Stella	Courtenay.
Sejrup, V. M.	Duncan.
Sellers, Jas. H.	414 Pender Street East, Vancouver.
Sherwood, Ernest G.	1327 Standard Bank Building, Vancouver.
Silver, Mark R.	2215 Powell Street, Vancouver.
Smith, Geo. W.	Nelson.
Smith, W. S.	2146 York Street, Vancouver.
Thomas, S. J.	Kelowna.
Thornbery, G. H.	Courtenay.
Trimble, C. A.	Armstrong.
Turnbull, Miss Margaret	Kelowna.
Valentin, V. M. B.	1170 Hornby Street, Vancouver.
Van der Wall, W.	Kamloops.
Washington, F. J.	1170 Hornby Street, Vancouver.
Watson, J. B.	Sardis.
Wells, Bruce	Ladner.
Wheeler, Fred. L.	1311 Broad Street, Victoria.
Wozencroft, E. G.	Eburne.

APPENDIX No. 30.

CREAMERY OR DAIRY LICENCES UNDER "DAIRIES REGULATION ACT" FOR THE YEAR 1919.

Name.	Address.
Almonds, Ltd.	400 Pender Street, Vancouver.
Borden Milk Co., Ltd.	Sardis.
Burns, P., & Co., Ltd	Woodland Drive, Vancouver.
City Dairy & Produce Co., Ltd.	Sixth Avenue and Sixth Street, New Westmin-
" " "	414 Pender Street East, Vancouver. [ster,
Clayburn Creamery	Clayburn.
Comox Creamery Association	Courtenay.
Courtenay Condensed Milk Co., Ltd.	"
Cowichan Creamery Association	Duncan.
" "	930 North Park Street, Victoria.
Curlew Creamery Co.	Grand Forks.
" "	Nelson.
East End Dairy	2469 Oxford Street, Vancouver.
Ferrara Cheese Co., Ltd.	Chilliwack.
Fraser Valley Milk Producers' Association	"
" " "	Clayburn.
" " "	Sardis.
" " "	1170 Hornby Street, Vancouver.
" " "	1327 Standard Bank Building, Vancouver.
Grandview Dairy	1170 Semlin Drive, Vancouver.
Hefferly Creek Creamery	Hefferly Creek.
Hillcrest Dairy	131 Fifteenth Avenue West, Vancouver.

APPENDIX No. 30—*Continued.*

Creamery or Dairy Licences under "Dairies Regulation Act" for the Year 1919—*Continued.*

Name.	Address.
Kamloops District Creamery Association	Kamloops.
Kelowna Creamery Co., Ltd.	Kelowna.
Knight, H. W.	Vernon Creamery, Vernon.
Mainland Dairy	Nineteenth Avenue and Oak Street, Vancouver.
Maple Leaf Dairy Co.	Nanaimo.
Meadowbrook Creamery	199 Water Street, Vancouver.
Nanaimo Creamery Association	Nanaimo.
New Westminster Creamery Society, Ltd.	New Westminster.
Northern Okanagan Creamery Association	Armstrong.
Northwestern Creamery, Ltd.	1311 Broad Street, Victoria.
North Vancouver Dairy	133 Fifth Street East, North Vancouver.
Pacific Milk Co., Ltd.	332 Drake Street, Vancouver.
Price & Green	905 Twenty-fourth Avenue East, Vancouver.
Revelstoke Creamery Co., Ltd.	Revelstoke.
Royal Dairy Co.	1001 Pender Street West, Vancouver.
" "	Douglas Street, Victoria.
Salmon Arm Creamery Association	Salmon Arm.
Saltspring Island Creamery Association	Ganges.
Spencer, David, Ltd.	Hastings Street West, Vancouver.
South Vancouver Milk Co.	537 Twenty-ninth Avenue East, Vancouver.
Standard Milk Co., Ltd.	405 Eighth Avenue West, Vancouver.
Steves, J. M., Dairy Co.	2144 Twelfth Avenue West, Vancouver.
Turner's Dairy, Ltd.	Seventeenth Avenue and Ontario Street, Vancou-
Valley Dairy, Ltd.	1569 Sixth Avenue West, Vancouver. [ver.
Vancouver Creamery, Ltd.	15-23 Alexander Street, Vancouver.
Vancouver Island Milk Producers' Association	930 North Park Street, Victoria.
Victoria City Dairy	1111 Fort Street, Victoria.
White Lunch, Ltd.	124 Hastings Street West, Vancouver.

APPENDIX No. 31.

Lower Mainland Conference, Women's Institutes of British Columbia.

(Held at the Masonic Hall, Abbotsford, B.C., Tuesday, Wednesday, and Thursday, October 14th, 15th, and 16th, 1919.)

Tuesday, October 14th, 2 p.m.—

"God Save the King."
Prayer.
Chairman's address.
Welcome: Reeve McCallum.
Greetings from Matsqui Women's Institute, Mrs. Phinney, President.
Greetings from Upper Sumas Women's Institute, Mrs. T. F. York, President.
Response, Central Park Women's Institute, Mrs. C. G. Reid, President.
Greetings from Vancouver Island Women's Institutes, Mrs. A. Blackwood-Wileman.
Greetings from the Okanagan Women's Institutes, Mrs. Trask.
Greetings from the Kootenay Women's Institutes, Mrs. Chalmers.
"The Aims and Objects of the Women's Institutes," read by Mrs. V. S. MacLachlan, Secretary.

Tuesday, October 14th, 3.30 p.m.—

Address: Hon. E. D. Barrow, Minister of Agriculture.
Music.
"Co-operation." Mrs. Chalmers and Haney Women's Institute.

APPENDIX No. 31—*Continued.*

LOWER MAINLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Tuesday, October 14th, 3.30 p.m.—*Continued.*

"Poultry and Egg-marketing." By Mr. Benson.

Appointment of Resolutions Committee.

Tuesday, October 14th, 7.45 p.m.—

"O Canada."

Paper: "The Division of the Family Income."

Music.

Address: "Consolidation of Schools."

Address: "Review of Benefits under Prohibition."

Wednesday, October 15th, 9.30 a.m.—

"The Maple Leaf."

Roll-call.

Three-minute reports from Institutes.

Wednesday, October 15th, 10.30 a.m.—

General Discussion of and Suggestions for Institute-work, led by Mrs. W. V. Davies, Chilliwack.

Wednesday, October 15th, 11.30 a.m.—

A talk from Miss Hayes, Household Science Instructor.

"Poulticing Hints." Mrs. Gaynor, Chilliwack.

Nominations for Advisory Board member.

Wednesday, October 15th, 2 p.m.—

"O Canada."

Roll-call.

Paper: "The Garden—an Asset to the Farm." Mrs. Tucker, Hazelmere.

Address: "Preventive Measures and Medical Inspection of Schools." Dr. Swift, of Abbotsford. Discussion led by Mrs. Reynolds, Chilliwack, and Mrs. Hardy, Hazelmere.

Wednesday, October 15th, 3.30 p.m.—

Address: "Mental Hygiene of School-children." Dr. J. G. McKay, New Westminster.

Music.

"Food and Diet." Miss Hayes.

Address: Mrs. Ralph Smith, M.P.P.

Address: "Womanly Ideals." Mrs. J. L. Campbell, Central Park.

Banquet, 6.30 p.m. Hostesses: Matsqui and Upper Sumas Women's Institute members.

Wednesday, October 15th, 8.30 p.m.—

Music.

Address: "Primitive Life." Professor Charles Hill-Tout.

"God Save the King."

Thursday, October 16th, 9.30 a.m.—

"The Maple Leaf."

Official delegates meet to elect the district member of Advisory Board.

Paper: "Relaxation." Mrs. Croft.

Paper: "Conservation of Effort." Mrs. J. B. Kirk, Strawberry Hill.

Paper: "The Need of Healthful Amusements and Recreation for Our Young People." Mrs. Cox, Coquitlam. Discussion led by Mrs. V. S. MacLachlan.

Thursday, October 16th, 2 p.m.—

"O Canada."

Inauguration of member of Advisory Board.

"Public Health." Mrs. V. S. MacLachlan. Discussion.

Reports of Resolutions Committee.

"God Save the King."

List of delegates—

Agassiz—Mrs. H. Fooks, Mrs. R. Roach, Mrs. W. S. Moore, Mrs. J. McRae.

Atchelitz—

APPENDIX No. 31—*Continued.*

Lower Mainland Conference, Women's Institutes of British Columbia—*Continued.*

List of delegates—*Continued.*

Burquitlam—Mrs. Marmost, Miss G. Bunting.
Central Park—Miss Summers, Mrs. J. C. Campbell, Mrs. G. C. L. Reid, Mrs. B. Forsyth.
Chilliwack—Mrs. W. V. Davies, Mrs. E. Gaynor.
Coquitlam—Mrs Johnston, Mrs. Cox.
Haney—
Hatzic—Miss Morrison, Mrs. Ferguson, Mrs. Fripp.
Hazelmere—Mrs. J. Halt, Mrs. E. H. Hardy.
Langley Fort—Mrs. M. A. Kent, Mrs. Leeder.
Matsqui—
Mission City—Mrs. Galloway, Mrs. Middleton.
Surrey—
Strawberry Hill—Mrs. Ethel McDougall.
Tynehead—Mrs. M. A. Inglis, Mrs. F. W. Currie.
Upper Sumas—Mrs. E. L. Winson, Mrs. T. F. York.
Langley Triangle—

APPENDIX No. 32.

Kootenay Conference, Women's Institutes of British Columbia.

(Held at Nakusp, B.C., Tuesday, Wednesday, and Thursday, October 21st, 22nd, and 23rd, 1919.)

Tuesday, October 21st, 2 p.m.—

"The Maple Leaf."
Invocation.
Opening address: J. Nelson, Esq., M.P.P., Slocan.
Welcome: President, Nakusp. Response: Mrs. Pitts, Vice-President, Nelson.
Song: Miss Brown Bonnington.
Greetings from Vancouver Island Women's Institutes, Mrs. A. Blackwood-Wileman.
Greetings from Lower Mainland Women's Institutes, Mrs. Fadden.
Greetings from Okanagan Women's Institutes, Mrs. Trask.
Chairman's address: Mrs. Chalmers, Thrums.
"Prohibition—How it Can Be Made More Helpful." Mrs. Fadden.
Roll-call: "Prohibition, Reason For or Against."
Appointment of Committees.
Music.

Tuesday, October 21st, 8 p.m.—

"The Maple Leaf."
Greeting: Mr. Abriel, Nakusp. Reply: Mrs. McLennan, Rock Creek.
"How Our Institutes are Co-operating." Open discussion led by Mrs. Ogilvie, Harrop; Mrs. Roberts, Kaslo; Willow Point; Mrs. Lyttle, Crawford Bay; and others.
"Red Cross Work in France." Miss Kaye, Nelson.
"Bees," lantern-slides. Mr. Sheppard, Nelson.
Music.

Wednesday, October 22nd, 9.30 a.m.—

"O Canada."
Reports of Secretaries; five minutes each.
"Public Health." Mrs. MacLachlan.
"Ways of Raising Money for Institute Funds." Mrs. Pratt, Thrums. Discussion: Burton City Women's Institute; Cranbrook Women's Institute; Willow Point Women's Institute.

Wednesday, October 22nd, 2 p.m.—

Voting for election of Advisory Board member.
Resolutions Committee report.
Discussion of resolutions.

APPENDIX No. 32—*Continued.*

KOOTENAY CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Wednesday, October 22nd, 8 p.m.—

Paper: "University Training for Our Young People." Mrs. Lyne, Creston. Discussion: Robson Women's Institute; Greenwood Women's Institute; and others.

Address: "Reconstruction." Mrs. Jas. Johnstone, Nelson.

"Social Unrest." Discussion.

Thursday, October 23rd, 9 a.m.—

Paper: "Rural Education." Mrs. Campbell, Arrow Park.

Discussion: "Improvement of Rural Schools." Miss Ivy Brown, Mrs. Walker, Nelson; and others.

"Consolidation of Rural Schools." Mrs. Clarke, Cranbrook.

"Child-walfare." Mrs. Hugh Ross.

List of delegates—

Arrow Park—Mrs. C. Campbell.
Boundary—Mrs. C. J. McArthur.
Burton City—Mrs. Porter.
Crawford Bay—Mrs. Lyttle, Mrs. Richardson.
Creston District—Mrs. Dow, Mrs. Lyne.
Cranbrook—Mrs. F. A. Clarke, Mrs. E. H. Leaman, Mrs. J. F. Fenton.
Harrop and District—Mr. R. McConnell.
Kaslo District—Mrs. Caldwell.
Nakusp—Mrs. E. Johnson, Mrs. Fowler, Mrs. Masters, Mrs. Powell, Mrs. Parks, Mrs. Mills, Mrs. Parent.
Nelson—Mrs. H. H. Pitts, Mrs. R. D. Hall, Mrs. J. Donaldson.
Robson—Mrs. A. F. Mitchell, Miss E. Allison.
Rock Creek—Mrs. A. D. McLennan, Mrs. Thorburn.
Kootenay Valley—Mrs. Pratt, Mrs. Powers.
Bonnington and South Slocan—
Willow Point—Mrs. H. Townsend, Mrs. P. F. Thompson.

APPENDIX No. 33.

NORTH THOMPSON AND OKANAGAN DISTRICT CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA.

(Held at Salmon Arm, B.C., Friday and Saturday, October 24th and 25th, 1919.)

Friday, October 24th, 9.30 a.m.—

"God Save the King."

Prayer.

Chairman's address.

Greetings.

Roll-call: "What Can I Do for Reconstruction?"

Report of the last Conferences: Mrs. V. S. MacLachlan, Secretary of Institutes.

Three-minute Reports of Institute Secretaries. Discussion of Reports, led by Kelowna delegate.

Appointment of Committees.

Friday, October 24th, 2.30 p.m.—

"O Canada."

Greetings: Mrs. Blackwood-Wileman, Chairman, Advisory Board.

(*a.*) "The Educational Value of Rhythm." Mrs. J. W. Thompson, Penticton. (*b.*) "The Educative Value of Play." Mrs. Butterworth, Kalamalka. Discussion led by ——, Tappen; ——, Similkameen.

Address: Mrs. Fadden, Advisory Board.

Music.

APPENDIX No. 33—*Continued.*

North Thompson and Okanagan District Conference, Women's Institutes of British Columbia—*Continued.*

Friday, October 24th, 8 p.m.—

Music.

Address of welcome: Mayor Clingan, Salmon Arm. Reply: Delegate from Vernon.

Address: "Dental Hygiene." Dr. K. C. MacDonald, M.L.A.

Paper: "Organizing for Health." Mrs. MacLachlan.

Address: "Legislating for Health." Mrs. Ralph Smith, M.L.A.

Saturday, October 25th, 9.30 a.m.—

Singing.

Lecture Demonstration. Miss Olive E. Hayes, Provincial Instructor of Household Science.

Questions.

"War Memorials." Mrs. Ruth Rounds, Naramata. Discussion led by Mount Ida and Barriere delegates.

Saturday, October 25th, 2.30 p.m.—

"Co-operative Buying and Selling." Mrs. Maxwell, Rutland. Discussion led by ——, Peachland delegate; Mrs. Chalmers, Advisory Board.

Address: Mrs. H. McGregor, Penticton.

Report of Resolutions Committee.

Discussion of resolutions.

Music.

Saturday, October 25th, 8 p.m.—

Address: Dr. Warnock, Superintendent of Women's Institutes.

Address: Mrs. Spofford.

Entertainment: Salmon Arm Institute.

"Auld Lang Syne."

List of delegates—

Barriere—Mrs. W. E. Betts, Mrs. J. W. Ramsay.

Kalamalka—Mrs. H. A. S. Bowsher.

Kelowna—Mrs. L. V. Rogers, Mrs. W. J. Austin.

Mount Ida—Mrs. Kernaghan, Mrs. H. Donnelly.

Naramata—Mrs. Ruth Rounds.

Okanagan Centre and Woods Lake—Mrs. I. B. Wilson.

Penticton—Mrs. H. W. L. Smith, Mrs. McGregor, Mrs. O. E. Fisher, Mrs. H. W. Mann.

Rutland—Mrs. Maxwell.

Salmon Arm—Mrs. P. Owens.

Salmon River Valley—Mrs. M. Thompson, Mrs. D. B. Butchart, Mrs. H. E. Thompson.

Silver Creek—Mrs. C. A. Elgood.

Summerland—Mrs. Bentley, Mrs. Lipsett, Mrs. Zimmerman.

Similkameen—Mrs. Newton, Mrs. Daly.

Vernon—Mrs. M. Stainton, Mrs. Richards, Mrs. Simms, Mrs. Clark, Mrs. Wilmot, Mrs. Duncan.

Peachland—

Tappen—Mrs. J. Smart.

APPENDIX No. 34.

VANCOUVER ISLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA.

(Held in the History Room of the Provincial Library, Parliament Buildings, Victoria, B.C., Monday, Tuesday, and Wednesday, October 27th, 28th, and 29th, 1919.)

Monday, October 27th, 2 p.m.—
"O Canada."
Chairman's address.
Greetings from the Kootenay Women's Institute, Mrs. Chalmers.
Greetings from the Okanagan Women's Institute, Mrs. H. McGregor.
Greetings from the Lower Mainland Women's Institute, Mrs. Fadden. Response: Mrs. Gold.
Address: Dr. Warnock, Deputy Minister of Agriculture.
Music.
Appointment of Resolutions Committee.

Monday, October 27th, 8 p.m.—
Address of welcome: Lady Barnard. Response: Mrs. S. F. Tolmie.
Music.
Address: Dean Quainton.
Music.
Social hour.

Tuesday, October 28th, 9.30 a.m.—
"God Save the King."
Paper by Mrs. Bartlett, Professor, Public Health Nursing, University of Washington.
Demonstration of Child Examination.
Paper: "Mental Hygiene of School-children." Dr. J. G. Mackay, New Westminster.
Discussion.

Tuesday, October 28th, 2 p.m.—
"State Health Insurance." Dr. Raynor, Victoria.
"The Relation of the Institute to Public Health Centres." Dr. H. E. Young, Victoria.
Discussion.

Tuesday, October 28th, 8 p.m.—
Address: Dr. the Hon. J. D. MacLean.
Films.
"Teeth." Illustrated lantern lecture, Dr. A. H. Tanner.

Wednesday, October 29th, 9.30 a.m.—
Institute Reports.
Discussion.
Address: Hon. Mr. Barrow, Minister of Agriculture.
"Goat-rearing in British Columbia." Mrs. V. S. MacLachlan.
Address: "Agricultural Education as a Moral Force in the Community." Mrs. H. E. Hallwright, V.S.A., Supervisor of School Gardens.
Discussion and Suggestions for Practical Co-operative Methods in Work and Ideas for Institutes. Led by Mrs. Watson, Mrs. McNaughton, Mrs. Brown, Mrs. Whidden, and others.

Wednesday, October 29th, 2 p.m.—
"O Canada."
Report of Resolutions Committee.
Unfinished business.
Roll-call.
Tea at Government House, by kind invitation of Lady Barnard.

Wednesday, October 29th, 8 p.m.—
"The Maple Leaf."
Address: Hon. John Oliver.
Song.
Address: Mrs. Schofield.

APPENDIX No. 34—*Continued.*

VANCOUVER ISLAND CONFERENCE, WOMEN'S INSTITUTES OF BRITISH COLUMBIA—*Continued.*

Wednesday, October 29th, 8 p.m.—*Continued.*

Song.

"A Talk on Astronomy." Illustrated by lantern-slides. Dr. Plaskett, Royal Observatory, Victoria.

"God Save the King."

List of delegates—

Colwood—Mrs. Neal, Mrs. Bickford, Mrs. Peat.

Comox—

Cowichan—Mrs. R. Whidden, Mrs. Christmas.

Garden City—Mrs. F. Birkett, Mrs. M. Hall, Mrs. P. Fryatt, Mrs. F. Harrison, Mrs. Hugill, Miss Sea.

Gordon Head—Mrs. McNaughton, Mrs. Mowat.

Langford—Mrs. P. N. Welch.

Metchosin—Mrs. C. Brown, Mrs. T. F. Helgesen.

North Saanich—Mrs. M. Simister, Mrs. J. Taylor, Mrs. W. Whiting.

Oyster District—Mrs. B. Gourlay, Mrs. A. Wilson.

Shawnigan and Cobble Hill—Mrs. MacMillan, Mrs. Elford, Miss Calder, Mrs. Dyson.

Sooke and Otter—

Tillicum—Mrs. Lowery, Mrs. Carver, Mrs. E. J. Ridout, Mrs. Elliot, Dr. Helen Ryan, Mrs. J. C. Newbury, Mrs. W. Duval, Mrs. Ashe.

South Saanich—Mrs. Lawrie, Mrs. Gold.

West Saanich—Mrs. Verdier, Mrs. Murray, Mrs. Guy, Mrs. Crocker, Mrs. Osborne, Mrs. Wallace, Mrs. Walker, Miss Maber.

Parksville—Mrs. H. R. Harrison.

Lake Hill—Mrs. S. F. Tolmie, Mrs. M. E. Service, Mrs. Calvert, Mrs. Mercer.

APPENDIX No. 35.

ESTIMATED HONEY-CROP, 1919.

Vancouver Island and Gulf Islands.

District.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Comox	40	186	9,300	50
Duncan	70	280	8,000	29
Gulf Islands	40	145	3,000	20
Howe Sound	32	64	1,200	20
Nanaimo	120	480	12,000	25
Victoria	163	500	15,000	30
Totals	465	1,655	48,500	30

Greater Vancouver.

Burnaby	83	413	8,000	20
Coquitlam	16	75	1,120	15
Kerrisdale	24	88	2,080	24
South Vancouver	59	358	4,320	12
Marpole	18	68	1,520	23
North Vancouver	46	230	4,240	20
Point Grey	13	58	1,120	21
New Westminster	30	120	2,400	20
Vancouver	93	404	7,120	18
Totals	382	1,814	31,920	18

APPENDIX No. 35—*Continued.*

ESTIMATED HONEY-CROP, 1919—*Continued.*

Lower Fraser.

District.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Delta	71	439	21,180	50
Surrey	94	502	19,060	38
Langley	70	453	17,920	40
Matsqui	120	596	39,420	66
Maple Ridge	47	276	16,140	60
Richmond	47	208	4,160	20
Totals	449	2,474	117,880	50

Upper Fraser and Chilliwack.

Chilliwack	80	365	7,300	20
Kent	18	93	1,395	15
Dewdney	19	131	5,240	40
Mission	59	223	7,136	32
Sumas	45	289	11,849	41
Totals	221	1,101	32,920	30

Okanagan.

Okanagan	223	1,338	66,900	50

Kootenays.

Slocan Valley	12	50	6,100	122
Kootenay Lake and West Arm	24	72	3,845	53
Nelson	20	88	6,600	75
Arrow Lakes	21	168	10,820	65
Castlegar	6	74	2,825	40
East Kootenay	5	86	1,200	14
Boundary	11	207	6,620	32
Creston Valley	26	169	8,450	50
Totals	125	914	46,460	50

Summary.

Territory.	Apiaries.	Hives.	Crop.	Average per Hive.
			Lb.	Lb.
Vancouver Island and Gulf Islands	465	1,655	48,500	30
Greater Vancouver	382	1,814	31,920	18
Lower Fraser	449	2,474	117,880	50
Upper Fraser and Chilliwack	221	1,101	32,920	30
Okanagan	223	1,338	66,900	50
Kootenays	125	914	46,460	50
Totals	1,865	9,296	344,580	38

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

THIRD ANNUAL REPORT

OF THE

WORKMEN'S COMPENSATION BOARD

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR THE

YEAR ENDING DECEMBER 31ST

1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable Edward Gawler Prior,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

May it please Your Honour:

The Third Annual Report of the Workmen's Compensation Board of this Province is herewith respectfully submitted.

JOHN OLIVER,

Premier.

Premier's Office,

March 1st, 1920.

The Workmen's Compensation Board,

Vancouver, B.C., February 28th, 1920.

The Honourable John Oliver, Premier,

Parliament Buildings, Victoria, B.C.

Dear Sir,—In pursuance of section 50 of the "Workmen's Compensation Act," we enclose herewith Annual Report.

We are,

Yours very truly,

E. S. H. WINN,

Chairman.

REPORT *of*
WORKMEN'S COMPENSATION BOARD.

To the Lieutenant-Governor in Council,
Victoria, B.C.

SIR,—In accordance with the requirements of the "Workmen's Compensation Act," being chapter 77 of the Statutes of 1916, the following report is made. This is the third annual report made by the Workmen's Compensation Board, the administering body under said Act. To those desiring a wider knowledge of the development and administration of the Act it is suggested that the two former reports be read herewith.

The same division as to departments will be observed as in the previous reports.

FINANCIAL—ASSESSMENTS AND AUDITS.

Over 500 new names were added to the list of employers during 1919. A marked increase in the industrial activity of the Province is shown by the fact that, although the rates and assessments were less than in either of the preceding years, the amount collected by the Board was 18 per cent. greater than during the second year. The amount paid on account of claims was also proportionately greater.

Notwithstanding the increased volume of business, the percentage of expense charged to employers was only 4.781 per cent. of the amount collected from them, being slightly less than the ratio of expense during either of the previous years. Of every $100 collected from the employer, $95.21 goes directly to the workmen or their dependents without any expense whatever to them. This is only possible by reason of the Act providing for the administration of the Accident Fund by a Board appointed for that purpose and to the exclusion of all intermediaries who might otherwise desire to make a profit out of the misery and distress of injured workmen.

It was again not necessary to charge the full basic rate of assessment in any of the classes, and in no class was a higher rate charged during the past year than one-half of the basic rate.

In a considerable number of classes it was found sufficient to collect the basic rate on only one-quarter of each employer's pay-roll. Among the industries from which this low rate was collected may be mentioned all work of municipalities, machine-shops, foundries and iron-working generally, ship-building, all work of general construction, fishing and canning, and the manufacture of explosives.

For example, take an industry with a basic rate of 2 per cent. If two assessments were made throughout the year, the cost to that industry would be on two-fourths of its pay-roll or one-half the basic rate—that is, 1 per cent. on the total pay-roll or 2 per cent. on half of the pay-roll.

By reason of legislation passed in 1918 provision was made for the payment of compensation to men injured in the various departments of Dominion Government work.

NEW CLASSES.

Three new classes were created during 1919, as follows:—

Class 17: Retail deliveries.

Class 18: The Great Northern Railway Company and its subsidiary companies were transferred from Class 8 and now constitute this class.

Class 19: Dominion Government employees.

The effect of class division is that all industries in that particular class carry only the losses that occur in that class. If the accidents are reduced in number and severity in a class, there is automatically a lessening on the drain on the funds in that particular class. The fewer accidents there are in a class the lower the cost to the employers therein.

RESERVES.

In all cases where pensions have been awarded to dependents of workmen who have been killed, or pensions awarded to workmen whose injuries have resulted in permanent disability, the present value of the pensions for their expected term has been placed in reserve and the

funds invested in Government securities in accordance with the requirements of the "Trustee Act," as is required by the "Workmen's Compensation Act." By this means the entire present and future cost of all accidents which happen in any year is borne by the employers who were engaged in industry in each of the several classes in that year. No burden therefore is thrown on the employers in future years on account of past accidents.

After three years' operation of the Act the reserves amount to $1,233,111.11. This amount includes an item of $15,000 per year (now amounting to $45,000) which has been set aside as a catastrophe reserve to protect against a possible catastrophe that may occur and which may not be attributable to or be a proper charge against any single class of industry.

The amount of the whole reserve may be expected to increase yearly until such time as the expiration of pensions occur as frequently as pensions are awarded. The investments are therefore made in as long-term bonds as are available for purchase. The funds of the reserve have to date been invested at a rate to yield an average of 5.85 per cent.

It is estimated that during the year 110,000 workmen were covered, with a pay-roll of $130,000,000.

STATEMENT OF THE CONDITION OF THE SEVERAL CLASS FUNDS ON DECEMBER 31ST, 1919, COVERING FIRST THREE-YEAR PERIOD OF APPLICATION OF ACT.

Class.	Industries.	Received from Employers.	Refunds.	Amount paid.	Reserve, Present Value of Pensions.	Balance in Class Funds.	Rates of Assessments, Proportion of Basic Rates assessed.		
							1917.	1918.	1919.
1	Lumbering, sawmills, shingle and lath mills, pulp and paper mills, creosoting-works, and logging-railways	$949,273 94	$1,740 54	$612,082 96	$377,623 76	$42,173 32*	2/4	3/4	2/4
2	Lighter forms of wood-working, planing-mills, sash and door factories, etc.	51,273 74	2 83	30,574 90	20,305 13	390 88	3/4	2/4	2/4
3	Coal-mining	468,431 52	.....	205,482 87	274,519 92	11,571 27*	4/4	3/4	2/4
4	Metal-mining, reduction of ores and smelting, quarrying, brick-manufacturing, etc.	292,974 14	1,368 16	164,455 98	127,680 48	1,030 48*	2/4	1/4	2/4
5	Iron and steel manufacturing, rolling-mills, iron or brass products, machine-shops, etc.	68,386 29	3 74	42,904 80	11,490 40	13,987 35	2/4	2/4	1/4
6	Lighter forms of manufacture, paints, shoes, flour, power-laundries, warehousing, etc.	148,808 44	640 94	77,590 73	66,478 06	4,098 71	2/4	2/4	2/4
7	Building and construction generally, wooden or steel-ship building, pile-driving, dredging, etc.	479,692 67	6,837 13	256,518 26	141,954 68	74,382 60	2/4	2/4	1/4
8	Electric light and power plants, N.E.S.; steam or electric railways, etc., N.E.S.; telephone or telegraph systems, N.E.S.; gasworks, N.E.S.; motion-picture machines, etc.	124,209 20	83 44	59,743 70	57,810 49	6,571 57	2/4	1/4	2/4
9	Navigation, stevedoring, wharf operation	126,968 79	254 65	71,844 47	39,000 54	15,869 13	3/4	2/4	2/4
10	Canadian Pacific Rly. and Cons. M. & S. Co. of Canada, Ltd., and their subsidiary companies	389,143 68	.....	133,856 73	231,574 48	23,712 47	2/4	2/4	2/4
11	Grand Trunk Pacific Rly. Co. and their subsidiary companies	17,925 84	.....	7,485 01	6,503 31	3,937 52	1/4	1/4	1/4
12	Canadian Northern Rly. Co. and their subsidiary companies	32,354 44	.....	18,431 37	15,382 30	1,459 23*	2/4	1/4	2/4
13	British Columbia Government	58,562 18	.....	13,686 56	29,753 52	15,122 10	....	1/4	1/4
14	Municipalities	59,657 06	.....	15,193 21	38,503 54	5,960 31	....	2/4	1/4
15	Canning or packing fish, fishing, fish oil and fertilizer manufacturing, kelp-collecting	72,634 42	.....	17,195 17	25,759 97	29,679 28	....	2/4	1/4
16	Explosives-manufacture, fireworks, fuses, chemicals, N.E.S.	31,133 77	.....	5,808 62	11,579 02	13,746 13	....	2/4	1/4
17	Retail employees (on request) and delivery	8,603 04	.....	4,634 81	3,677 44	290 79	....	....	1/4
18	Great Northern Rly. Co. and their subsidiary companies	4,292 92	.....	2,801 12	1,434 00	57 80	....	....	2/4
19	Dominion Government	9,397 51	.....	628 50	58 25	8,710 76	....	....	1/4
	Totals	$3,393,723 59	$11,431 43	$1,740,919 77	$1,481,089 29	$160,283 10	....	....	....

* Indicates debit balance.

STATEMENT OF CONDITION OF ACCIDENT FUND ON JANUARY 1ST, 1920, COVERING 1917, 1918, AND 1919.

Receipts.

From employers, assessments		$3,393,723 59
From employers, medical aid		139,611 92
From workmen, medical-aid dues		481,552 12
From interest on investments		75,625 87
		$4,090,513 50

Disbursements.

Current—Compensation paid to workmen		$1,567,170 97
Refunds paid employers of overpayment of assessments		11,431 43
Medical Aid—Physicians, hospitals, drugs, etc.		620,761 46
Reserve—		
Pensions paid	$ 257,733 54	
Payments to dependents residing in Canada, made under Statute, 1919	65,870 51	
		323,604 05
Value, Dec. 31st, 1919, of future payments of pensions on approved claims—		
Invested	$1,211,778 15	
Cash available for pensions, Dec. 31st, 1919	21,332 96	
		1,233,111 11
Expense (three years)	$ 183,748 80	
Less paid by B.C. Government, Feb. 5th, 1917	10.000 00	
		173,748 80
Cash on hand to credit of classes, Dec. 31st, 1919	$ 65,357 89	
Invested for credit of classes, Dec. 31st, 1919	94,925 21	
Balance to credit of classes, Dec. 31st, 1919		160,283 10
Cash on hand, Dec. 31st, 1919, to credit of medical aid		402 58
		$4,090,513 50

STATEMENT OF CONDITION OF MEDICAL AID FUND ON DECEMBER 31ST, 1919, COVERING 1917, 1918, AND 1919.

Receipts.

Medical aid paid by workmen at 1 cent per day	$481,552 12
Share contributed by employers	139,611 92
	$621,164 04

Disbursements.

Physicians, hospital, drugs, etc.	$620,761 46
Balance on hand, December 31st, 1919	402 58
	$621,164 04

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STATEMENT OF VOLUME OF BUSINESS FOR YEAR 1919 AND SHOWING CONDITION OF THE SEVERAL CLASS FUNDS ON DECEMBER 31ST, 1919.

Class.	Industries.	Balance at Dec. 31st., 1918.	Received from Employers, 1919.	Compensation paid, 1919.	Transferred to Reserve Account, 1919.	Balance in Class Funds, Dec. 31st, 1919.	Rates of Assessments, Proportion of Basic Rates assessed.
1	Lumbering, sawmills, shingle and lath mills, pulp and paper mills, creosoting-works, and logging-railways	$444 89	$439,557 71	$277,945 60	$204,230 32	$42,173 32*	2/4
2	Lighter forms of wood-working, planing-mills, sash and door factories, etc.	3,615 74	20,396 26	14,514 57	9,106 45	390 88	2/4
3	Coal-mining	1,135 55	129,818 18	82,626 22	57,627 68	11,571 27*	2/4
4	Metal-mining reduction of ores and smelting, quarrying, brick-manufacturing, etc.	19,662 35	96,824 98	65,034 92	52,482 89	1,030 48*	2/4
5	Iron and steel manufacturing, rolling-mills, iron or brass products, machine-shops, etc.	5,250 21	31,192 11	16,976 69	5,478 28	13,987 35	1/4
6	Lighter forms of manufacture, paints, shoes, flour, power-laundries, warehousing, etc.	9,316 47	58,444 27	32,106 59	31,555 44	4,098 71	2/4
7	Building and construction generally, wooden- or steel-ship building, pile-driving, dredging, etc.	49,880 26	213,434 56	126,093 81	62,838 41	74,382 60	1/4
8	Electric light and power plants, N.E.S.; steam or electric railways, etc., N.E.S.; gasworks, N.E.S.; motion-picture machines, etc.	1,893 86	38,492 79	19,102 05	14,713 03	6,571 57	2/4
9	Navigation, stevedoring, wharf operation	4,977 26	47,274 23	31,293 98	5,088 38	15,869 13	2/4
10	Canadian Pacific Rly. and Cons. M. & S. Co. of Canada, Ltd., and their subsidiary companies	72,590 44	142,553 36	50,797 88	140,633 45	23,712 47	2/4
11	Grand Trunk Pacific Rly. Co. and their subsidiary companies	3,564 96	6,813 65	3,494 98	2,946 11	3,937 52	1/4
12	Canadian Northern Pacific Rly. Co. and their subsidiary companies	2,921 63	8,000 56	8,986 04	3,395 38	1,459 23*	2/4
13	British Columbia Government	9,812 13	23,586 87	10,052 49	8,224 41	15,122 10	1/4
14	Municipalities	865 73*	20,438 02	8,815 48	4,796 50	5,960 31	1/4
15	Canning or packing fish, fishing, fish oil and fertilizer manufacturing, kelp-collecting	21,108 64	38,949 80	10,099 58	20,279 58	29,679 28	1/4
16	Explosives-manufacture, fireworks, fuses, chemicals, N.E.S.	3,679 11	18,572 86	3,006 69	5,499 15	13,746 13	1/4
17	Retail employees (on request) and delivery	.....	8,603 04	4,634 81	3,677 44	290 79	1/4
18	Great Northern Rly. Co. and their subsidiary companies	.....	4,292 92	2,801 12	1,434 00	57 80	2/4
19	Dominion Government	.....	9,397 51	628 50	58 25	8,710 76	1/4
	Totals	$206,716 67	$1,356,643 68	$769,012 10	$634,065 15	$160,283 10	.....

* Indicates debit balance.

STATEMENT OF CONDITION OF ACCIDENT FUND ON DECEMBER 31ST, 1919, COVERING 1919.

Receipts.

Cash on hand, January 1st, 1919—		
To credit of classes	$ 206,716 67	
To credit of medical aid	8,274 84	
Available for pensions	15,582 97	
		$ 230,574 48
Collections during 1919—		
From employers, assessments	$1,356,643 68	
From employers, medical aid	69,759 96	
From interest on investments	52,420 25	
From workmen, medical-aid dues	211,476 17	
		1,690,300 06
		$1,920,874 54

Disbursements.

Current—Compensation paid to workmen		$ 689,924 98
Refunds paid employers of overpayment of assessments		8,381 59
Medical Aid—Physicians, hospitals, drugs, etc.		289,108 39
Reserve—		
Pensions paid	$174,903 74	
Payments to dependents residing in Canada, made under Statute, 1919	65,870 51	
		240,774 25
Value, Dec. 31st, 1919, of future payments of pensions on approved claims—		
Invested	$439,961 16	
Cash available for pensions, Dec. 31st, 1919	21,332 96	
		461,294 12
Expense		70,705 53
Cash on hand to credit of classes, Dec. 31st, 1919	$ 65,357 89	
Invested for credit of classes, Dec. 31st, 1919	94,925 21	
Balance to credit of classes, Dec. 31st, 1919		160,283 10
Cash on hand to credit of medical aid, Dec. 31st, 1919		402 58
		$1,920,874 54

STATEMENT OF CONDITION OF MEDICAL AID FUND ON DECEMBER 31ST, 1919, COVERING 1919.

Receipts.

Balance to credit of medical aid, Dec. 31st, 1918	$ 8,274 84
Medical aid paid by workmen at 1 cent per day during 1919	211,476 17
Share contributed by employers during 1919	69,759 96
	$289,510 97

Disbursements.

Physicians, hospital, drugs, etc.	$289,108 39
Balance on hand, Dec. 31st, 1919	402 58
	$289,510 97

BALANCE-SHEET AS AT DECEMBER 31ST, 1919.

		Assets.	Liabilities.
Debentures and bonds, cost value, Reserve Account		$1,211,778 15	
Debentures and bonds, cost value, Current Account		94,925 21	
Reserve investments—			
B.C. Government bonds, par value	$1,200,000 00		
Dominion Government bonds, par value	135,000 00		
Current Fund investments—			
B.C. Government bonds, par value	100,000 00		
Par value of investments	$1,435,000 00		
Cash—			
Current Account, Dec. 31st, 1919		65,357 89	
Medical Aid Account, Dec. 31st, 1919		402 58	
Reserve Account, Dec. 31st, 1919		21,332 96	
Reserve—			
Value, Dec. 31st, 1919, of future payments of pensions on approved claims		.....	$1,233,111 11
Reserve and interest	$1,473,885 36		
Less pensions and bonus paid	240,774 25		
Reserve value, Dec. 31st, 1919	$1,233,111 11		
At credit of classes, Dec. 31st, 1919, to pay claims not yet allowed		.....	160,283 10
At credit of medical aid, Dec. 31st, 1919, to pay bills not yet allowed		.....	402 58
		$1,393,796 79	$1,393,796 79

STATEMENT OF CONDITION OF THE RESERVE FUND ON DECEMBER 31ST, 1919, COVERING 1919.

Balance to credit of reserve, Dec. 31st, 1918		$ 787,399 96
Present value of pensions approved during 1919		634,065 15
Interest on invested reserve		52,420 25
		$1,473,885 36
Pensions paid during 1919	$ 174,903 74	
Payments to dependents residing in Canada, made under Statute, 1919	65,870 51	
		240,774 25
Present value of future payments on approved claims, Dec. 31st, 1919		$1,233,111 11
Invested—		
20-year 5% Debenture Bonds, B.C. Government—		
Dec. 1st, 1917, at price to earn 6⅛%	$ 300,000 00	
April 1st, 1918, at price to earn 6⅛%	200,000 00	
Nov. 1st, 1918, at price to earn 6⅛%	100,000 00	
Dec. 1st, 1918, at price to earn 6⅛%	200,000 00	
20-year 5½% Victory Loan, Dec. 1st, 1917	25,000 00	
15-year 5½% Victory Loan, Dec. 6th, 1918	50,000 00	
Invested during 1919—		
20-year 5% Debenture Bonds, B.C. Government—		
May 16th, 1919, at price to earn 5.4%	300,000 00	
July 1st, 1919, at price to earn 5.5%	100,000 00	
15-year 5½% Victory Loan, Nov. 15th, 1919	30,000 00	
15-year 5½% Victory Loan, Nov. 15th, 1919	30,000 00	
	$1,335,000 00	
Purchase price of bonds	$1,211,778 15	
Cash on hand, Reserve Account, Dec. 31st, 1919	21,332 96	
Cash and investments on hand, Dec. 31st, 1919		$1,233,111 11

Average rate of interest on cost of bonds, 5.85 per cent.

CLAIMS.

The admission of certain employees of the Dominion Government within British Columbia to the benefits of the Act, the inclusion of all retail delivery employees, and the application of many employers not engaged in industries covered by the Act to have their employees extended the benefits of the Act greatly increased the number of workmen within the scope of the Act. It was also observed during the year that there was a greater tendency on the part of the individual employers to have themselves included under the protection of the Act as employees in accordance with the provisions thereof.

During 1919 a total of 18,185 claims were made upon the Board. Of this number, 17,908 were non-fatal claims and 277 were fatal. Of the 277 fatal claims made, 93 were in respect of accidents happening during 1918, leaving 184 workmen fatally injured during 1919. This represents the lowest number of fatal accidents during any of the past three years.

During the three years of the Act's operation 53,634 non-fatal claims were filed, and during that period, in addition, 734 workmen have been fatally injured, so that the year 1919 is considerably below the average in that respect. A total of 867 persons are now receiving monthly pensions by reason of these fatalities. Ten widows have remarried and are therefore not now included in that total.

The great disasters of 1917 and 1918 accounted for about 137 deaths, and in comparing this with the total number of fatal injuries the fact is brought home that the lesser accidents are much more costly to human life than are the great disasters, although the latter attract more attention at the time of their happening.

In 151 claims pensions were awarded to widows and other dependents, and for the three years in which the Act has been in operation up to the end of 1919 pensions have been granted in a total of 347 claims.

By a 1919 amendment to the Act the pensions paid to dependents residing in foreign countries were revised according to the cost of living in those countries as compared with the cost of living in Canada. The surplus reserve fund created by this, as divided every six months among dependents residing in Canada, resulted in a total payment of $65,870.51 being made in July and December, 1919.

A total of 17,908 claims were made in respect of non-fatal injuries. This represents a considerable improvement as compared with the total of 22,258 claims made in the year 1918, such improvement being to some extent a natural result of the campaign of education, the regulations for accident-prevention, and the prompt rendering of first-aid service.

In addition to this number, there were about 7,500 minor accidents for which the injured workman received first aid from the employer, incurred no expenses and lost no time, and therefore had no compensable claim. Reports of such minor accidents are not counted as claims; for example, small cuts, slivers, etc.

The advantage of reporting minor accidents even where there could be no claim made was brought out on quite a number of occasions during the year when a seemingly minor accident developed more serious consequences at a later date; for example, a scratch on the hand that later resulted in a condition of blood-poisoning. Had the minor accident not been reported there would have been considerable trouble in proving that the later disability was due to accident arising out of and in the course of employment.

During the year 9,242 claims were paid and finally disposed of. Some of these were handled in one payment only to the workman, whereas others required to be adjusted partially each month over a considerable length of time. During the year 32,038 cheques were issued to workmen and dependents and for medical aid.

Seven thousand and eighty-eight claims were dealt with in which the workmen had not lost more than three days, and were therefore not entitled to compensation for time lost. Such claims were officially designated as "no time lost." Medical accounts, however, were taken care of in these cases.

The Board was unable to allow 384 claims during the year for various reasons, such as accidents happening on the way to and from work-places, recurrence of old hernia, rheumatism, tonsillitis, tuberculosis, fever, "flu," etc.

A total of 871 claims in respect of accidents which happened during 1918 lapsed during the year 1919, the workmen having failed to make application for compensation within a year from the date of accident as required by the Act. These claims were mainly cases in which the

workman had lost from four to six days. One remarkable case was that of a workman who filed an application for compensation forty-five minutes before the expiry of one year after the accident. He had not troubled about the claim until he happened to be in Vancouver, and then, as he stated, filed the application out of curiosity to see what would happen to it. He was paid.

At the end of the year there were 822 claims awaiting the filing by the workman of an application for compensation. There was an average of 1,492 claims per month during 1919. In the month of December 1,562 non-fatal claims were received.

On December 31st there were 1,877 unfinished claims in process of adjustment. Of this number partial or monthly payments had been made on account of 487 claims. The balance of 1,390 unadjusted claims was on account of accidents which happened shortly before the end of the year, in which the files were not complete enough to warrant a payment either on account or in full.

In comparison with previous years it is quite noticeable that the percentage of accidents to the number of workmen covered is considerably lower not only in number, but in extent of severity and time lost.

The promptness in adjustment of claims depends upon the claimant, his doctor, and his employer complying with the Act's requirements in the filing of necessary forms.

As in former years, minor accidents were the cause of more trouble in proportion to their number than the more serious accidents. Before the medical expenses can be paid it is necessary that proof of accident be supplied. The workman is required to forthwith notify the employer of the happening of the accident. The employer is required to report all accidents within three days of their happening.

Permanent Partial Disability.

The same methods as to rehabilitation as were outlined in the Second Annual Report were continued during 1919.

Re-employment.

Every effort is made to find employment for the injured where he is unable by reason of his particular disability to return to the old employment. The workman's employer invariably co-operates with the Board in this effort.

Re "Princess Sophia" Disaster.

As reported in last year's report, this action of the Canadian Pacific Railway Company against the Board came on for trial before Mr. Justice Clement on March 10th and 11th, 1919. Judgment was given on March 14th, 1919, in favour of the company. From this judgment the Board appealed to the Supreme Court of British Columbia, which Court also decided in favour of the company. The Board then appealed to the Privy Council, the Court of last resort, with the result that final judgment was in favour of the Board. In effect the result is that those sections of the "Workmen's Compensation Act" which govern allowance in case of accident to the workman beyond the limits of the Province are within the powers of the Provincial Legislature; further, that the Board was justified in making payment to those dependents of workmen who lost their lives in the territorial waters of the United States.

ACCIDENT-PREVENTION.

Tabulated records of accident experience from a number of large industrial plants, in which mechanical guarding regulations are enforced, reveal the startling fact that not more than 15 per cent. of the total accidents which occur can be prevented by mechanical guard. This means that the main responsibility for safeguarding life and limb rests with the foreman and workmen themselves. Therefore, accident-prevention is fast coming to mean an organized educational campaign to reach these foremen and workmen.

With this fact in mind, an additional set of regulations for accident-prevention was brought into force on January 16th, 1920. These provided, among other things, for the formation of an Accident-prevention Committee in every manufacturing plant, workshop, and logging camp where fifty or more men are employed. An energetic Accident-prevention Committee in each establishment, composed of two or more employees, could carry on a campaign that would

eliminate 70 per cent. of the accidents which now occur through carelessness, bad judgment, inexperience, unsafe practices, violation of instructions, indifference, and insufficient inspection by employer.

This committee's duty is to receive suggestions from the workmen as to conditions and methods of work, pass on these recommendations, determine their practicability, and, with the co-operation of the management and the workmen, familiarize themselves and their fellow-workmen with the cause of accidents in their own plant with a view to avoiding the repetition of similar accidents. The committee should be composed of live employees who appreciate the extent of the present economic waste and the needless sacrifice of life and limb, the majority of which can be eliminated by a properly organized and carried-out campaign for more careful, safe, and sane methods of doing their work.

The aim of every Accident-prevention Committee should be to make their particular establishment as nearly 100 per cent. safe as it is possible to make it. To do this every moving part of machinery, wherever located, on which a workman might be injured if he came in contact with it in any way should be kept guarded. It is the moving part in the place "where nobody ever goes" which causes a large number of accidents.

The broad principle is that safeguards should be designed and constructed so that they will prevent *all* accidents, not only on the guarded part while the workman is at his regular work, but also to the workmen or passer-by in case they slip or fall or carelessly touch the machine. No properly constructed guard will restrict production. If a guard interferes with production it can be replaced by one that is properly designed. In no case should a guard be so constructed that the workman feels that he wants to take it off because it hampers him at his work.

It is true that each accident prevented and each safeguard installed in an industrial establishment means not only reducing the drain on the funds, and therefore the cost to the employer, but also conserving and preserving man-power both to the Province and the nation.

The following Accident-prevention Regulations became effective on January 16th, 1920:—

The Accident-prevention Regulations effective June 16th, 1918, are hereby amended by adding thereto, after section 9, under heading of "General," the following as section 9A:—

"9A. Dressing or soap shall not be applied to belt while in motion."

Section 15 of said regulations, under heading of "General," is hereby repealed, and the following is substituted therefor:—

"15. *Fly-wheels or Pulleys.*—All sections of fly-wheels or pulleys with spokes which are six feet six inches (6′ 6″) or less from the floor or platform and which are exposed to contact shall be guarded. Fly-wheels or pulleys which run in pits shall be provided with handrail and toe-board around the pit."

Section 40 of said regulations, under heading of "General," is hereby repealed, and the following is substituted therefor:—

"40. *Ladders.*—All movable ladders (except substantial step-ladders) shall be provided with either sharp points at the foot or non-slip feet or other effective means to prevent slipping. When ladders are used on cement or iron floors where spikes will not hold, ladders shall be equipped with non-slip feet of not less than six (6) square inch surface on each foot. Ladders for use in oiling overhead shafting, where necessary to rest same on the shafting, shall be arranged to hook over the shafting. Ladders shall extend at least two feet (2′) above top of landing."

Said regulations, under the heading of "General," are hereby amended by adding thereto the following sections:—

"55. *Tighteners.*—A chain or cable shall be attached to all tightener-frames to prevent tightener-pulley striking other pulley or workmen when belt breaks.

"56. Hammers, chisels, punches, flatners, hardies, fullers, drills, and tools shall not be used if they have burrs or mushroom heads.

"57. Handles shall be of sound material, securely fastened to hammer or axe.

"58. When grinding double-bit axe one cutting-edge shall be guarded.

"59. Steel and wrought-iron chains shall be annealed at regular intervals to avoid danger of crystallization.

"60. When it is necessary to raise a slip with a winch, the slip shall be equipped with counter-balance weight, unless by permission of Inspector.

"61. Proper lighting shall be provided in all establishments where workmen are employed."

Section 1 of said regulations, under the heading of "Laundries," is hereby repealed, and the following is substituted therefor:—

"3. *Body-ironers.*—Iron hood lined with asbestos and vent-pipe over heated roll shall be provided for all body-ironers, same to act as a guard for upper portion of roll. All body-ironers installed hereafter shall have finger-guards."

Said regulations, under the heading of "Laundries," are amended by adding thereto after section 5 the following as section 5A:—

"5A. *Extractors, Washers, Bushings, and Spindles* shall be examined by a competent person at least once a year. If extractor does not run true when properly loaded, the machine shall be stopped immediately and repaired."

Said regulations, under the heading of "Laundries," are hereby amended by adding thereto the following sections:—

"9. *Boilers and Vessels* under pressure shall not be used until inspected, and at no time shall they carry greater pressure than that allowed by Inspector.

"10. Where pressure allowed on vessels is less than that allowed on boilers, there shall be a reducing-valve, and pressure-gauge installed on steam-pipe as per instructions of Inspector.

"11. *Steam-pipes* exposed to contact shall be protected."

Said regulations, under the heading of "Sawmills," are hereby amended by adding thereto after section 10 the following as section 10A:—

"10A. Counterbalance weight for swing-saws where practicable shall be installed at front of saw."

Said regulations, under the heading of "Sawmills," are hereby amended by adding thereto the following section:—

"14. Overhead log-turners shall be equipped with roller or sheave, so that the slack of chain or cable shall hang at least two feet (2') clear of carriage."

Said regulations, under the heading of "Shingle-mills," and numbered 1, 2, 3, 4, 5, 6, and 7, are hereby repealed, and the following are substituted therefor:—

"SHINGLE-MILLS.

"1. *Vertical Shingle-saw.*—(*a.*) The periphery and inside of the shingle-saw shall be guarded to prevent chips or knots flying from saw, injuring workmen.

"(*b.*) The cutting-face of the saw shall be guarded. If guard is at side of saw, it shall project one and one-half inches (1½") past cutting-edge of saw when sawyer is putting in shingle-block, and shall not be more than one-quarter inch (¼") from side of saw.

"2. *Clipper-saw.*—(*a.*) There shall be a guard over clipper-saw, securely fastened with three bolts; said guard shall not be more than four inches (4") above saw and not more than one-half inch (½") from the perpendicular line of saw.

"(*b.*) Clipper-saw shall be encased, except that part of saw which is absolutely necessary to trim shingles.

"(*c.*) Clipper-boards shall be equipped with finger-guards five inches (5") long and one and one-quarter inches (1¼") deep, no heavier than sixteen (16) gauge, nor lighter than twenty (20) gauge, made of steel.

"3. Ratchet-levers on set-works shall be guarded.

"4. *Fly-trips.*—Fly-trips shall not be used on shingle-machines.

"5. All shingle-machines shall be equipped so that the carriage will stop when the treadle that operates the jaw of the carriage is down and will not start machine when treadle comes up. It shall be necessary for operators to put foot on the other treadle to start machine.

"6. Saw-arbors shall be covered.

"7. *Saw.*—(*a.*) When cutting sixteen-inch (16") shingles the minimum diameter of saw shall be thirty-six inches (36").

"(*b.*) When cutting eighteen-inch (18") shingles the minimum diameter of saw shall be thirty-eight inches (38").

"8. The speed of carriage shall not exceed thirty-four (34) strokes per minute.

"9. *Shingle-jointers.*—The front or cutting face of knife-type shingle-jointers shall be fully guarded, with the exception of a narrow slot through which the shingles may be fed against the knives.

"10. *Power-bolters.*—These shall have spreader behind saw and railing of standard size around the carriage-track from front of saw.

"11. *Pinion-gears.*—These shall be covered on all shingle-machines.

"12. *Pulleys and Belts* shall be guarded.

"13. *Drag-saws.*—All gears and frictions on drag-saws shall be guarded.

"14 Refuse-hole at side of clipper-saw shall be guarded.

"15. All guards shall be kept in proper place.

"(*See* General Rules for other machinery and transmission.)"

Said Accident-prevention Regulations are hereby further amended by adding thereto after section 15, under the heading of "Elevators," the following:—

"FIRE AND GAS.

"1. Adequate fire-escapes of practical design shall be provided in all workshops located above the first story of the building, and all interior stairways and passage-ways shall be so constructed and kept clear as to avoid congestion in case of fire.

"2. All buildings in which workmen are employed shall be furnished with means of extinguishing fire.

"3. The main inside and outside doors shall open outwardly, and any doors leading to or being the principal or main entrance to the factory, or to any tower, stairway, or fire-escape therein, or belonging thereto, shall not be bolted, barred, or locked at any time during the ordinary and usual working-hours of the factory.

"4. Every ammonia-compressor plant shall keep at all times in good repair at least one gas-mask.

"6. All ammonia-compressor plants shall have two exits situated to the satisfaction of the Workmen's Compensation Board.

"EXPLOSIVES.

"1. Explosives shall be in charge of a competent person and kept locked in a proper magazine away from all works, buildings, and camps and from the danger of sparks from locomotives and logging-engines, and shall be issued only in quantities as are required from day to day.

"2. Detonating-caps shall be kept in locked cases and issued only to shotlighters; and no person shall carry in his pockets or on his person in or around a place of employment detonators or similar inflammable substances.

"3. Packing-boxes, packing, cartons, or other containers which have been in contact with explosives shall be destroyed in an open field, either by applying kerosene to them and a flame through a train of papers or by other safe method.

"4. Workmen shall not drill out a hole which has once missed fire.

"5. An iron or steel tamping-rod shall not be used for ramming or tamping.

"CANDY-MANUFACTURING.

"1. *Sizers* shall be equipped with guard in front of rolls and so arranged that it will raise or lower with the roll.

"2. *Cutters* shall have a guard over knives.

"3. All pulleys, sprockets, chains, frictions, gears, and set-screws shall be guarded.

"4. *Belting.*—Wherever women are liable to come in contact with belting it shall be guarded, so as to prevent it from attracting their dresses or hair.

"(*See* General Rules from transmission.)

"ELECTRICAL SAFETY REGULATIONS.

"1. *Guarding Live Parts.*—All live parts of switches, fuses, circuit-breakers, control devices, relays, terminals, and other electrical equipment shall be adequately protected by metallic covers or cases, excepting that:—

"(*a.*) Covers constructed of insulating material may be allowed when equivalent protection is given.

"(*b.*) Live parts around switchboards, lightning-arresters, and other equipment for which the providing of covers or cases is not reasonably practicable shall be isolated by elevation or provided with suitable permanent enclosures, guards, or screens so arranged as to prevent persons or conducting objects from inadvertently coming or being brought in contact with the live parts. Around electrical machines and switchboards in power plants and sub-stations where accessible to properly qualified persons only, open live parts may under certain conditions be used without guards or screens.

"(*c.*) Open disconnecting knife-switches may be permitted, provided they are adequately isolated by elevation and operated only by approved insulating-rod with hook.

"2. Subject to the exceptions in the foregoing rule, all knife-switches in circuits of over 150 volts between conductors shall be enclosed in a standard approved steel box or cabinet or of iron-clad type, with switch-handle provided for external operation, and switch shall be operated by this handle only. This rule shall apply immediately to all switches as specified, with the exception that ordinary internally operated switch-boxes and open switches on switchboards and power-distributing panels which are otherwise in good condition may be permitted to remain in operation until such time as replacement by the externally operated type is ordered by the Board.

"3. All externally operated switches shall have the 'on' and 'off' positions distinctly marked.

"4. The doors of all switch-boxes shall be kept closed and only opened after switch-handle is thrown to the 'off' position, with the exception that they may be opened with switch 'on' by properly authorized persons for the purpose of making examination of fuses or switch and where the driven machinery cannot be shut down during such examination.

"5. When any switch is open to allow of repairs or inspection of the equipment supplied, it shall be locked, or as far as practicable secured in the 'off' position, and notice 'not to be closed' attached thereto.

"6. All switches on switchboards and all switch-boxes shall be provided with identification for the circuits or equipment which they control.

"7. *Fuses.*—All fuses shall be of the regular approved enclosed type only, and shall be of suitable capacity to protect their cables and equipment. All bridging of fuses by wire or other material will be a violation of this rule.

"8. All fuses, except those in two wire circuits operating at not more than 150 volts between conductors and carrying not more than thirty amperes, shall be made 'dead' before handling: Provided, however, that fuses shall always be made 'dead' before handling, regardless of voltage and current, in locations where a person may have to stand on grounded surfaces when re-fusing. This rule requires an individual switch ahead of every fusible cut-out as specified for the purpose of separately disconnecting the fuses of each circuit from all sources of supply. Motors operated by starting devices which do

not require separate knife-switches ahead of them may have their running fuses made dead by branch feeder switch, provided same is within convenient access from these fuses.

"9. Combined fuses and switches installed after these rules go into effect shall be arranged with the switch ahead of the fuses. Switches fused at the top and installed previous to these rules going into effect shall be changed on special order of the Board.

"10. *Wiring.*—All wiring shall be installed and maintained in standard and approved manner. It shall be so protected as to reduce the life hazard as far as practicable; all necessary screens, guards, enclosures, conduits, or isolation by elevation being provided.

"11. *Circuit-breakers.*—Air-break circuit-breakers shall be so located and shielded that persons will not be burned by the arc produced or have their eyes injured by the glare of the arc.

"12. Parts such as handles or levers which may move suddenly in such a way that persons in the vicinity are liable to be injured by being struck by them shall be guarded.

"13. *Electric Furnaces.*—Electric furnaces and arc welders, where intensely glowing or incandescent arcing parts may be exposed, shall be enclosed so that those parts will not be accessible or visible to unauthorized persons. Suitable protecting screens, hoods, gloves, and other devices shall be provided for and used by the authorized operators or others who must work or come near such parts.

"14. *Grounding.*—All exposed non-current-carrying metallic parts of electrical equipment operating at over 150 volts to ground shall be permanently and effectively grounded. This includes covers, cases, conduits, handles, levers, and such metallic parts for starters, switches, circuit-breakers, fuses, etc., and frames of motors, generators, transformers, switchboards, etc. This rule shall also apply to electrical equipment operating at less than 150 volts to ground, unless such equipment is effectively insulated.

"15. All transformer secondaries shall be grounded, provided the maximum voltage between the grounded point and any other point on the circuit does not exceed 150 volts.

"16. Ground-wires shall be properly run, secured, protected, and maintained throughout their entire length, and shall be attached to water-pipe or other satisfactory ground by means of a regular ground-wire clamp or other method giving equivalent rigidity of connection.

"17. *Insulating Platforms.*—Insulating platforms or mats shall be placed in front of all switches, control devices, or other parts connected to circuits of over 150 volts to ground, and which may be handled when circuits are alive. Exceptions may be allowed by the Board at switchboards and panels in power-stations and sub-stations where the type of equipment and construction used gives sufficient protection to the live parts.

"18. *Rotating Electrical Machinery.*—All rotating parts of electrical machinery shall be so constructed, maintained, and guarded to reduce all hazard as far as practicable.

"19. *Illumination.*—Adequate and suitable illumination as is necessary to prevent accident shall be provided at all switchboards, fuse-boxes, starters, control devices, around electrical machines, and at other places where persons may come into proximity to live parts.

"20. *General.*—Whenever practicable, motor starters or controllers shall be so placed as to be within view from their respective motors.

"21. When painting, cleaning, repairs, or other work has to be carried out by non-electrical men around any buildings, bridge, or other structure, and in proximity to wires or parts of electrical equipment which are so normally isolated by elevation, such wires or parts shall be provided with guard or shall be made 'dead' while the work is being done.

"22. When linemen are at work on poles or other structures located where persons pass and may suffer injury from falling tools, material, etc., a temporary guard, fence, or notice shall be used to prevent or warn persons from passing beneath the linemen.

"23. 'Danger, High Voltage' notices shall be placed in prominent position and maintained in legible condition in proximity to all electrical equipment of 750 volts or over, and which may be accessible to unqualified persons.

"24. Installation, repairs, extension, and changes of electrical equipment shall be carried out by properly qualified persons only.

"25. All electrical equipment generally shall be so constructed, installed, and maintained as to reduce all hazard as far as practicable.

"26. All electrical equipment shall be so constructed, installed, and maintained as to make all operating rules herein specified readily and conveniently practicable.

"27. When new type of equipment or new arrangements and methods of operation are adopted which might justify departure from any of the foregoing rules, special permission regarding use of same shall first be obtained from the Board."

The regulations, under the heading of "Cranes" and "Safety Standards for Cranes," are hereby repealed, and the following are substituted therefor:—

"Cranes and Derricks.

"1. Factor of safety for all parts other than gears, and complete hoist mechanism, 5.

"2. Factor of safety for brakes is 1.5.

"3. Floorman shall, wherever possible, walk ahead of moving load and warn people to keep clear of it.

"4. An approved foot- or hand-operated gong or other effective warning-signal shall be placed in a location convenient to the operator and be securely fastened.

"5. Crane-bumpers shall be provided and shall be at least one-half of the diameter of the truck-wheel in height. Both truck-wheel bumpers and trolly-bumpers shall be fastened to the girder and not to the rails.

"6. Cranes shall be operated only by regular crane operators, authorized substitutes, crane repairmen, or inspectors; no one else shall enter cage.

"7. Access to and exit from the crane-cage shall always be by stationary ladders, stairways, or platforms provided for the purpose. Cranemen shall keep their hands free when going up and down ladders.

"8. Safe means shall be provided for passing from crane-cab to bridge footwalks, and shall consist of fixed ladders or stairs with handrails.

"9. Cages shall be kept free of clothing and other personal belongings. Tools, extra fuses, oil-cans, waste, and other articles necessary in the crane-cage shall be stored in a tool-box and not left loose in or about crane.

"10. An approved fire-extinguisher shall be carried in the crane-cage for use in case of fire.

"11. A footwalk with handrail and toe-board shall be placed along the entire length of the bridge on the motor side. This walk shall be at least five feet (5′), preferably six feet six inches (6′ 6″), below the bottom of the overhead trusses, and shall be not less than eighteen inches (18″) in width, except where it passes the bridge-motor, where it may be reduced to fifteen inches (15″). Footwalks shall be of substantial construction and rigidly braced.

"12. Truck-fenders shall be provided, and shall extend below the top of rail and project in front of all bridge and trolly truck-wheels and shall be attached to the trolly or the bridge and frame. They shall be of a shape and form that will tend to push and raise a man's hand, arm, or leg off the rail and away from the wheel.

"13. Cranes which are subjected to heat from below shall have a steel plate lined with asbestos and placed six inches (6″) below bottom of cage.

"14. Cranes and derricks shall be inspected every day and kept in perfect working-order. All working-parts shall be oiled daily. Cables shall be kept well oiled.

"15. Wherever loads are to be carried over a long distance to a high position, they shall be carried as close to the floor as possible until final location is reached; load shall then be lifted to desired height.

"16. No person shall be allowed to ride on hook or load.

"17. When repairing cranes, it shall be located where the repair-work will least interfere with the other cranes and with operator on the floor.

"18. Before starting repairs, the repairman shall see that all controllers are thrown 'off' position, that main or emergency switches are open, and one of them shall be locked.

"19. Where a crane is to be repaired, there shall immediately be placed warning signs or out-of-order signs on crane and on floor beneath. If other cranes are operated on the same runway, safety-stops shall be placed at safe distance.

"20. Workmen shall not work on floor beneath crane while it is being repaired. Crane shall not be operated after repaired until all safety devices are installed and loose material removed.

"21. All electrically operated cranes shall be equipped with limit switches for the purpose of preventing overwinds.

"22. Where crane-cage is provided with electric heaters or electric lights, the wiring for same shall be run and secured in a regular manner and provided with a fuse and switch.

"23. All exposed metal parts on electrically operated cranes, and which do not carry current, including handles, conduits, covers, motor-frames, the entire frame of the crane and tracks shall be permanently and effectively grounded.

"24. Blocks shall be constructed so that the cable cannot jump off the sheave.

"25. Gudgeon on top of derrick shall have a forelock to prevent leg-strap from coming off gudgeon.

"26. All gears, pinions, and set-screws shall be guarded. (*See* General Regulations.)

"27. All sheaves where workmen could be caught between cable and sheave shall be guarded.

"28. Hand-winches shall be equipped with dog that will hold load, and dog shall be kept in place while lifting load.

"29. All frictions shall be guarded.

"30. Main rod on hoisting-engine shall be guarded.

"LOGGING OPERATIONS.

"1. *Tail-sheave Guards.*—When logs are hauled on established skid-road, the tail-sheave shall be so guarded that no one may be caught between the sheave and the on-running rope.

"2. *Slings.*—All sling-ropes to which blocks are attached shall be of strength equal to twice that of the hauling-line. If necessary, more than one turn of ropes smaller than hauling-line may be used. When conditions require a multiplication of blocks, the number of turns of the sling-rope must be increased in proportion to the multiplication.

"3. In ground-yarding, employees shall not be required to work in the bight of the line unless there be sufficient stumps, trees, or other substantial barrier to afford them reliable protection.

"4. Pins and fastenings of high lead sheaves shall be of a strength commensurate with the maximum strains that may be imposed upon them by a strain on the hauling-line equal to its breaking-strength as rated by manufacturers. All pins must be securely fastened with a forelock.

"5. When conditions of unloading require that an unloading-line be attached to logs or cars or passed under the logs, the equipment shall be so arranged that it will be unnecessary to do any of the work of attaching the unloading-line on the unloading side after the chains or chocks are released.

"6. *Log-landings.*—Where practicable in laying out log-landings or rollways, the loading-donkey must be so placed with reference to the landing or rollway that the donkey engineer has a full and unobstructed view of the landing and rollway and cars.

"7. When an independent loading-donkey is used in hoisting the logs when loading, it must be so set as to be entirely clear of the car that is being loaded.

"8. When necessary to install a log-landing or rollway on a main line, warning signs which conform to British Columbia Railway Act Rules shall be provided and set eighty (80) rods from each end of the landing or rollway, and must be maintained during all of its operations and until the landing or rollway is torn out.

"9. When in yarding it is necessary to haul logs across a track, every train must be brought to a full stop within two hundred feet (200′) of the point of crossing, unless given signals by flagman to proceed. Warning signs to conform to British Columbia Railway Act Rules shall be provided and set eighty (80) rods from each side of skidway and shall be maintained during all its operations.

"10. Before camp buildings are erected, the trees around the camp-site shall be felled before the camp is built to a sufficient distance therefrom to prevent trees from falling on camp buildings when felled later or blown down.

"11. There shall be sufficient lights to light all entrances to all buildings, walks, and steps around the camp, and same shall be kept in good condition. Steps shall have handrails. Walks over fifteen inches (15″) from ground shall have handrail on both sides.

"12. Spikes, drift-bolts, and nails shall not be driven in any log that is to be cut into timber or lumber.

"13. Head-spars, tail-trees, and gin-poles shall be carefully selected, and shall have sufficient guy-wires so that the breaking-strain shall be double the breaking-strain of cable.

"14. Before operating spar-trees, all dead trees, small trees, or trees where limbs are liable to fall and all snags and sweepers shall be removed to a safe distance.

"15. When an employee is required to work aloft on a standing spar or pole, he shall use a safety-belt composed of either wire-line or wire-cord manila rope.

"16. All trees to be used for riggers or dead men shall be inspected by foreman and tested to working-strain of cable before it is allowed to be used. Every person must be well clear when test is being made.

"17. There shall be a safety-choker on all high lead blocks fastened to the guy-line so that if the main strap should break the block would not fall directly to the ground.

"18. The end of cables shall be securely fastened to the drum. There shall be not less than two full turns of cable on the drum. All hooks, rings, and shackles shall be securely fastened to cables, and all shackles shall have a forelock.

"19. The working-strain on cable shall not exceed the working-strain guaranteed by manufacturers of cable.

"20. Main lines, standing lines, and loading-lines shall not be used if there are six broken wires in one rope lay, nor if the outer wires be worn more than thirty-five (35) per cent. of their original diameter; when worn thirty (30) per cent., not more than three broken wires; when worn twenty (20) per cent., four wires are broken; when worn ten (10) per cent., five broken wires.

"21. All fastenings shall be remade at least once in six months, and the piece composing the connection to load annealed so as to avoid crystallization.

"22. Main lines, high lead and loading lines, blocks and cables shall be inspected by foreman or riggerman before being hung, and shall be inspected every other day by riggerman or foreman, and shall be well oiled. Blocks shall not be oiled while in motion.

"23. Swamp hooks or tongs shall be attached to crotch-line with clevices or approved safety device.

"24. When lifting or hauling big timber, chokers shall be used.

"25. Swampers or other workmen not directly connected with falling and bucking timber shall not be allowed to work where they are in danger of being injured by trees being felled by fallers, or from limb or other trees that fall on account of being struck by tree being felled.

"26. When logs are to be hauled on established skid-road, all dead trees, dangerous small trees, or trees where limbs are liable to fall and all snags and sweepers shall be removed to a safe distance before operating skid-road.

"27. All limbs of a dangerous nature shall be taken off trees close to log before log is loaded.

"28. No person shall be allowed to ride on hook or log while loading, or while log is being hauled, or while log is travelling down a grade chute or in a flume.

"29. When sawing logs off a tree lying on an incline, the bucker shall, when possible, work on the upper side.

"30. All cars used for carrying loggers, when practical, shall be equipped with saw and axe racks, and all saws and axes shall be in racks.

"31. Fallers shall see that their spring-boards are in safe condition at all times.

"32. When a tree is ready to fall, the faller shall give ample warning.

"33. Signalmen shall not give signal ahead until every one is in the clear. All workmen shall watch for sweepers and stubs.

"34. There shall be a guard at side of main rod of all hoisting and logging engines to prevent main rod from striking workmen.

"35. All gears, frictions, sheaves, set-screws, keys, ends of shafts, and spoke-hazards shall be guarded as per General Rules.

"36. Wedges and hammers with burrs or mushroom tops shall not be used. All handles shall be of sound material and securely fastened.

"37. *Whistle Signals (Logging-engines).*—The following signals shall be used exclusively by engineer on logging or loading engines:—

Ahead	1 short.
Stop	1 „
Come back	2 „
Ahead slow	3 „
Come back slow	2 short repeated.
Slack lines	Several short toots.
Locomotive	3 long.
Section crew	5 „
Foreman	4 „
Tree-rigger	2 long and 1 short.
Accident	3 long followed by 4 long.
Tighten lines	3 short followed by 2 short.
Water	2 long.
Shut off water	1 „
Fire	Several long and short in succession.

"RAILWAYS OPERATING UNDER THE JURISDICTION OF THE DEPARTMENT OF RAILWAYS OF BRITISH COLUMBIA.

"1. The rules and regulations made in pursuance of the provisions of the 'British Columbia Railway Act,' chapter 194, R.S.B.C. 1911, and all amendments thereto, shall be deemed and are hereby declared to be a part of the rules and regulations of this Board.

"2. All employees whose duties are prescribed by rules filed and approved under the 'British Columbia Railway Act' shall be provided by the railway company with a copy of said rules, and a receipt for same taken and kept on file in the company's office.

"3. Locomotives having any defect considered dangerous shall be forthwith reported to Provincial Inspector of Railways, and shall not be operated without Inspector's order.

"4. Engineers operating locomotives on railways under the jurisdiction of the Department of Railways in the Province of British Columbia shall pass an examination pertaining to operation of a locomotive, and engineers shall furnish the Inspector with a certificate from competent medical doctor as to their visual acuity and hearing before receiving certificate, and at any other time the Inspector requires it.

"5. Engineers shall not allow persons other than the train crew or authorized officials to ride on locomotives without a written order from manager or superintendent.

"6. Engineers shall before starting to work with their locomotives see that they are in proper working-order.

"7. Conductors shall personally inspect all cars, especially loads with logs, before being coupled to the engine, and shall satisfy themselves that all cars are properly and securely loaded and that the couplings and air-brakes are in good order, and if there is any doubt as to the safety of such loading or the efficiency of the brakes or couplings shall decline to move such loaded cars. In case any conductor shall while in transit consider any car unsafe, the train shall proceed slowly to nearest side-track, and the conductor shall set out the said car before proceeding with his train.

"8. Conductors shall see that all persons ride in a safe position on cars. No person or persons shall be allowed to ride on cars loaded with logs except the train crew.

"9. Trainmen shall not allow persons to get on or off trains while in motion.

"10. Trainmen shall see that the tracks are clear when workmen are working before moving cars. Cars shall not be 'kicked' on to tracks where cars are being loaded or unloaded or where there are boarding-cars.

"11. No cars shall be left on main line without being properly protected by red flag and torpedoes by day, and when weather or other conditions obscure the day signals, by a red light and torpedoes.

"12. Head-lights shall be displayed to the front of every train by night.

"13. All locomotives shall be equipped with appliances for sanding the rail in front and back of wheels, and shall have a sufficient supply of dry sand at all times.

"14. All locomotives in logging-railway service shall be equipped with a fire-pump and one hundred feet (100′) of not less than one and one-half inch (1½″) water-hose and nozzle or one hundred feet (100′) of one and one quarter inch (1¼″) six (6) ply steam-hose and nozzle connected to the discharge-pipe of injector.

"15. Power-driven speeders or power-driven cars shall not exceed a speed of twenty (20) miles per hour without a special order from the superintendent or train-dispatcher. If power-driven car is pulling hand-car loaded with men, the speed shall not exceed ten miles per hour.

"16. Head-lights shall be displayed to the front of every power-driven speeder or power-driven car at night.

"17. Locomotives shall not be moved either under steam or otherwise, either on shop-track or in round-house, without first making sure that there is no person or persons working around or under same, and the bell shall be rung at all times before moving.

"18. Where workmen are repairing engines or cars, a blue flag by day and a blue light by night shall be displayed at both ends, so that train crews can see signals. Engines or cars thus protected shall not be coupled or moved.

"19. Where workmen display the blue signals, they alone are authorized to remove them. Other cars must not be placed on the same track so as to intercept the view of the blue signals without notifying the workmen working on said engines or cars.

"20. Workmen shall not be allowed to stand in front of moving engines or cars for the purpose of boarding same, whether engine or car is proceeding backward or forward.

"21. Workmen shall not be allowed to enter between cars when in motion for the purpose of adjusting draw-bars or knuckles, or raising locking-blocks, or turning angle-cock, or uncoupling air-hose with either hand or foot.

"22. Workmen shall not shove over draw-bars with foot while cars are in motion in order to ensure coupling.

"23. Switch-stands, structures, and material shall be placed not less than six feet (6′) from gauge side of nearest rail, except upon written order from Board or Department of Railways.

"24. All main-line switches shall have a target. Railways operating after sunset shall have lights on switch-stands on main line. Switches situate on trestle-work shall be planked between the rails for a distance of fifty feet (50′) around the switch and shall have at least six feet (6′) square platform at switch-stand and substantial railings.

"25. All frogs, switches, and guard-rails shall be packed.

"26. All cars used for carrying loggers, where practical, shall be equipped with saw and axe racks, and all saws and axes shall be in racks.

"27. All tracks leading from main line shall be equipped with a derail, and shall be set at a sufficient distance to prevent cars fouling main line in case of derailment. Derails shall be placed on all log-loading tracks.

"27A. All derails on side-track shall have a fixed signal six feet (6′) from derail.

"27B. When necessary to install a derail on main line, warning signs which conform to British Columbia Railway Rules shall be provided and set eighty (80) rods from each direction of derail, and shall be maintained during all its operations and until derail is removed.

"28. The road-bed shall be properly graded. Rails shall be of sufficient weight to carry the equipment, and shall have a sufficient number of ties properly spaced.

"29. Broken rails shall be removed immediately.

"30. All bridges and wharves shall be full tied; ties shall be bound to keep them in proper place.

"31. All bridges and wharves shall be kept in good repair, and shall be inspected by competent men once every six months.

"32. All bridges shall be equipped with a guard-rail inside of their running rail to full length of structure.

"33. Where surrounding conditions are such that the bridge or trestle affords the only practicable thoroughfare for employees, a single plank runway not less than twelve inches (12″) wide and two inches (2″) thick shall be provided and maintained between the rails and extend from end to end of such bridge or trestle.

"34. On trestles and bridges whose length exceeds four hundred feet (400′), an emergency or safety platform must be provided at points not more than two hundred and fifty feet (250′) apart. These stations must provide standing-rooms for not less than four persons and be provided with floor and substantial handrails. They must admit of four persons standing far enough to the side or below to be entirely clear of projections from sides of passing trains.

"35. Where practicable, safety-switches and high lines shall be installed on grades four (4) per cent. or over at dangerous places and at sharp curves. Safety-switches shall be set for high lines. Trains descending grades shall come to full stop before switch is thrown, and switch shall be thrown for high line after train passes over.

"Boilers and Pressure-vessels.

"1. The rules and regulations made in pursuance of the provisions of the British Columbia 'Boilers Inspection Act,' 1901, chapter 7, section 1, and all amendments thereto, are deemed and are hereby declared to be a part of the rules and regulations of the Workmen's Compensation Board.

"2. Boilers of two (2) nominal horse-power and under and all steam-heating plants, compressed-air tanks, gas tanks, retorts, and all other tanks or reservoirs used for holding liquids or gaseous substances that are not under the 'Boilers Inspection Act,' 1901, chapter 7, section 1, shall not be operated until inspected or a permit from the Board.

"3. Inspectors are to fix the working-pressure of all boilers and pressure-vessels, and at no time shall the pressure exceed the pressure fixed by Inspector.

"4. Each boiler or pressure-vessel under these regulations shall have an identification tag attached to the boiler or vessel in such a manner as directed by the Inspector.

"5. In order to satisfy the Inspector as to the thickness of a plate or the internal conditions of a boiler or pressure-vessel, the Inspector may, should he deem it necessary, order holes to be cut in it, and may also demand that such information, by drawing and specification of the several parts, be furnished him as will enable him to determine, by calculation and examination, their strength.

"6. Boilers of two (2) nominal horse-power or less shall be equipped with two (2) spring-loaded pop safety-valves of approved pattern of not less than one-half inch (½″) diameter; one shall be of the lock-up type, correct steam-pressure gauge, water-gauges, test-cocks, and blow-off cocks. All fittings and connections shall be in good working-order, sufficient in number, and they shall comply with the requirements of the 'Boilers Inspection Act.'

"7. Each boiler shall be provided with a separate feed-water arrangement having a regulating-valve at the boiler-front; a stop-valve and a check-valve are to be fitted on the feed-pipe.

"8. Every boiler, except otherwise provided, must be fitted with a fusible plug; this plug to be placed where instructed by the Inspector. Fusible plugs are to be filled with banca tin, which must be renewed at least once a year.

"9. In order to prevent misunderstandings and possible reductions in working-pressure and alterations when the Inspector makes his first examination, designs may be submitted to the Chief Inspector for all boilers, stop-valves, main stop-valves, blow-off cocks, water-gauge fittings, and test-cocks to be used under the provisions of these regulations; and all designs for safety-valves must be submitted for approval.

"10. Boilers or vessels having any defect considered dangerous shall be forthwith reported to the Workmen's Compensation Board, and shall not be operated without Board or Inspector's orders.

"11. When the pressure allowed on vessel connected to a boiler is less than that allowed on the boiler, there shall be a reducing-valve, safety-valve, and pressure-gauge installed on steam-pipe as per instructions of Inspector.

"12. All smoke-stacks shall be kept in good repair and securely fastened.

"13. The basic factor for all pressure-vessels not subject to heat stresses shall be three (3), with additions for the different methods of construction as provided in the 'Boilers Inspection Act.'

"14. There shall be proper and efficient means for lighting so that the water-gauges and steam-pressure gauges can be distinctly seen at all times.

"ACCIDENT-PREVENTION COMMITTEE.

"1. Every manufacturing plant, construction camp, logging camp, and workshop in which fifty or more men are employed shall have an Accident-prevention Committee of not less than three members.

"2. The general duties of the Accident-prevention Committee shall be:—

"(*a.*) To make a thorough inspection not less than once a month of the entire plant or place of employment for the purpose of receiving complaints, determining hazardous conditions, and receiving recommendations for their improvement.

"(*b.*) To hold regular meetings at least monthly for the discussion of current accidents, their causes, and suggested means of preventing their recurrence, and to investigate all serious accidents and report their findings in writing to their employers, keeping a copy of such findings and minutes of all meetings and recommendations in the records of the committee.

"(*c.*) To educate their fellow-employees against dangerous practices and methods of work.

"(*d.*) To investigate fire conditions, examine fire-escapes, fire-extinguishers, water-buckets, sand-buckets, and all fire-fighting appliances.

"(*e.*) To inspect lighting arrangements in all places of employment, and to report to the employers all insufficiently lighted passage-ways and other places where workmen are liable to be injured in the course of their employment.

"(*f.*) To inspect or arrange for the inspection of all machinery, transmission motor-stops, cables, blocks, slings, chains, tongs, tools, and equipment.

"(*g.*) To provide at each establishment facilities for receiving written complaints and recommendations.

"3. The committees in connection with the logging camps shall, in addition to its other duties, inspect particularly all spar-trees, gin-poles, skid-roads, and general working conditions in and about the camps."

The 1918 Accident-prevention Regulations, together with the above, were consolidated for the sake of convenience and printed. The consolidated regulations were then forwarded to every employer affected thereby. Large numbers were also forwarded to unions and committees thereof.

It is a source of great gratification to be able to report that employers and workmen are heartily co-operating in their efforts to prevent accidents.

MEDICAL DIVISION.

Under the First-aid Service Regulations every employer having more than ten and less than fifty workmen is required to provide and maintain in his factory or place of employment a first-aid kit containing certain supplies to be used in the giving of first aid to injured workmen. Every employer employing twenty or more men, where the employer is situate more than five miles from the office of a medical practitioner, is to maintain in or about his place of employment a person possessing a certificate of competency, to the satisfaction of the Board, to render first aid to the injured. Every employer having 200 or more workmen is required to provide an emergency first-aid room as well as some one possessing a certificate of competency, to the satisfaction of the Board, to render first aid to the injured. The type and extent of the equipment in each employer's plant is dependable upon the number of workmen employed. Every employer employing 100 or more workmen is required to have available for immediate use some satisfactory vehicle or means of transportation to convey injured workmen to the nearest hospital or doctor. Where an employer has less than fifty workmen and is more than five miles from a hospital or doctor, he is required to supply a first-aid room and equipment. All vessels and trains are

likewise required to have first-aid equipment. All employers are required to supply immediate transportation to hospital or doctor for all injured workmen.

Inasmuch as the Board requires the employer at his own expense to provide this first-aid service, it in turn requires the workman to forthwith report all trivial injuries to that first-aid service department, so that by prompt attention a more serious condition may be prevented. Failure on the workman's part to avail himself of this service, and consequences arise which could have been provided against by first-aid attention, may have the effect of jeopardizing payment of compensation. It is quite evident that this service cannot be effectual unless advantage is taken of it.

We have had the greatest co-operation from all parties concerned with respect to this service, and as a result it is believed that a very large number of minor injuries were minimized in severity, the general result being that the workman is saved a time loss and the employer a great deal of unnecessary cost.

Inasmuch as the Act entitles all injured workmen to medical, surgical, and hospital treatment, transportation, nursing, medicine, crutches, and apparatus, including artificial members, as it may deem reasonably necessary at the time of the injury, and thereafter during the disability to cure and relieve from the effects of the injury, the Board has disbursed during 1919 $289,108.39. During the past three years there has been disbursed for medical service to injured workmen $620,761.46. This cannot help but give an idea of the amount of medical service rendered to disabled workmen.

There has been a most harmonious feeling existing between the Board and the members of the medical profession as well as between the Board and the hospitals. It is believed that this harmonious condition has very materially contributed to the successful working of the Act.

STATISTICAL.

The following statistical tables are made up from information collected from all accidents on which final payments were made during the year 1919. The accidents dealt with did not all occur during the year, and, on the other hand, a number of accidents occurring during 1919 are not included since they have not yet been finally disposed of by final payment.

The main tables and charts are on the same lines as those presented for 1918, which were designed with special reference to the three important classifications:—

(1.) Industry:
(2.) Cause:
(3.) Nature of injury.

Two new tables are presented which will help to make the information more complete. These show the age of the workman and the length of his disability.

The tables and charts are presented in the following order:—

Table A deals with the amounts paid out for all accidents, whether fatal or otherwise, and shows the industry in which the accident occurred, the amount paid, and the heading under which the accident was listed; i.e., whether temporary disability, permanent partial, or fatal.

Table A 1 is a summary of all totals shown in Table A.

Table B covers 9,242 temporary disability accidents and gives the following information regarding same:—

(1.) Industry:
(2.) Workman's wage loss:
(3.) Average daily wage:
(4.) Sex:
(5.) Conjugal state:
(6.) Whether workman was receiving other sick benefits:
(7.) Nationality.

Table B 2 is a summary of the totals shown in Table B.

Table C gives the causes of all accidents dealt with and the amounts paid out for time lost, permanent partials, and fatals. The temporary disability accidents are also shown in the class in which they occur.

Table D shows the various parts of the workman's body which were injured in 9,242 temporary disability accidents, the classes of industry in which such injuries occurred, the nature of the injury, and the amount paid according to the part of the body injured.

Table E is a table with reference to 487 permanent disability accidents which were finalled in 1919. The accidents are shown according to the nature of the injury and the class of industry in which they occurred, and there is also given the total amount and the average amount paid according to the part of the body injured.

Table F shows the age of the injured workman in 9,242 temporary disability accidents and the industry classification in which the accidents occurred.

Table H shows the length of time for which the workman was disabled in 9,242 temporary disability accidents and industry classification in which the injuries occurred.

Chart 1 is drawn to show the proportions of the different industries responsible for the 9,242 temporary disability accidents dealt with. The figures are as follows:—

Logging	1,402
Ship-building	1,363
Sawmills	1,088
Coal-mining	840
Railways	703
Quarrying, metal-mining	670
General manufacturing	364
Navigation and stevedoring	358
Wood-working	309
Shingle-manufacturing	304
Building and construction	288
Smelting	273
Pulp and paper manufacturing	241
Metal-working	189
Machine-shops and foundries	137
Canning and packing	135
Municipalities	131
Teaming	122
Provincial Government	119
Wholesalers	41
Explosives	32
Fishing	30
Laundries	26
Retailers, janitors, etc.	25
Power, light, and gas	23
Telegraph and telephone	20
Dominion Government	5
Miscellaneous	4
Total	9,242

Chart 2 is drawn to show in proportion the different causes of 9,242 temporary disability accidents. The figures are as follows:—

Falling objects	2,176
Hand-tools	1,099
Slipping and stumbling	731
Handling heavy objects	712
Falls of persons	681
Power-driven machinery	645
Vehicles and transportation	395
Striking projections	382
Conveying apparatus	343
Mine-cars	306
Flying objects	277
Sawmill machinery	239
Electricity and heat	239
Carried forward	8,225

Brought forward	8,225
Shingle-mill machinery	164
Handling cable, etc.	150
Autos and motor-cycles	128
Animals	119
Transmission apparatus	103
Stepping on nail	78
Poison	72
Steam and gas engines	48
Explosions	45
Sharp instruments	32
Shutting doors	32
Steam-pressure apparatus	30
Miscellaneous	9
Miscellaneous machinery	7
Total	9,242

Chart 3 gives the proportion of the various causes responsible for 487 permanent partial disability accidents. The figures are as follows:—

Falling objects	77
Power-driven machinery	73
Shingle-mill machinery	56
Sawmill machinery	40
Hand-tools	35
Conveying apparatus	34
Flying objects	34
Vehicles	23
Falls of persons	23
Transmission apparatus	14
Handling heavy objects	13
Mine and quarry cars	13
Striking projections	10
Handling wire, cables, etc.	8
Steam and gas engines	8
Explosives and explosions	7
Shutting doors	4
Slipping and stumbling	3
Electricity and heat	3
Animals	3
Steam-pressure apparatus	3
Miscellaneous	2
Total	487

TABLE A.—STATEMENT SHOWING TOTAL AMOUNT PAID IN EACH INDUSTRY ON ACCOUNT OF ALL FINALLED ACCIDENTS DURING 1919.

Sub-class.	Industry.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.						FATAL ACCIDENTS.					ALL FINAL AWARDS.
				CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.		PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	
		No. of Claims.	Amount of Compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost	No.	Reserve.	No	Amount.		Total Amount.
	Class No. 1.														
1	Creosoting-works	7	$ 865 38	1	$ 465 50	1	$ 1,330 54	1	$ 1,796 04	1	$ 4,383 32	1	$ 75 00	$ 4,458 32	$ 7,119 74
2	Lath-mills, including yards and delivery	9	226 40	1	145 36	..	.....	1	145 36	..	.....	.	.....	.....	371 76
3	Lumbering, including logging, river-driving, rafting, or booming	1,314	109,218 84	66	15,596 04	26	18,852 49	66	34,448 53	17	56,935 36	34	2,393 00	59,328 36	202,995 73
4	Pulp and paper manufacturing	241	11,321 45	15	2,875 31	6	5,240 50	15	8,115 81	2	5,165 32	1	75 00	5,240 32	24,677 58
5	Sawmills, including yards and delivery	1,088	49,861 35	66	18,047 81	14	14,992 86	66	33,040 67	13	44,659 89	18	1,290 50	45,950 39	128,852 41
6	Shingle-mills, including yards and delivery	304	17,451 87	61	8,852 57	14	6,789 13	61	15,641 70	1	3,456 16	3	225 00	3,681 16	36,774 73
7	Logging-railways (operation, construction, and maintenance)	88	7,684 74	7	1,760 73	4	2,695 13	7	4,455 86	5	18,373 33	7	491 00	18,864 33	31,004 93
		3,051	$196,630 03	217	$47,743 32	65	$49,900 65	217	$97,643 97	39	132,973 38	64	$ 4,549 50	137,522 88	$431,796 88
	Class No. 2.														
1	Artificial limbs	1	$ 162 29	1	$ 203 87	..	.....	1	$ 203 87	..	.....	..	.....	.....	$ 366 16
4	Broom and mop manufacturing	4	184 66	1	24 06	..	.....	1	24 06	..	.....	.	.....	.....	208 72
5	Carpentering (shop only)	4	205 18	..	.....	..	.....	..	.....	..	.....	..	.....	.....	205 18
6	Coffins, wooden, manufacturing	8	574 84	1	307 81	1	748 43	1	1,056 24	..	.....	..	.....	.....	1,631 08
7	Cooperage (no stave or head manufacturing)	6	275 17	..	.....	..	.....	..	.....	..	.....	..	.....	.....	275 17
8	Veneer and excelsior manufacturing	10	181 57	..	.....	..	.....	..	.....	..	.....	..	.....	.....	181 57
9	Furniture-manufacturing	17	645 76	3	443 21	1	571 44	3	1,014 65	..	.....	..	.....	.....	1,660 41
13	Wood-working plants, planing-mills	90	3,251 60	11	1,997 81	3	2,895 21	11	4,893 02	1	$ 3,442 26	1	$ 75 00	$ 3,517 26	11,661 88
14	Sash and door manufacturing	25	788 47	2	117 85	..	.....	2	117 85	1	3,495 10	..	.....	3,495 10	4,401 42
16	Vehicle-manufacturing	4	170 91	1	79 15	1	292 69	1	371 84	..	.....	..	.....	.....	542 75
17	Wooden-box manufacturing	82	2,051 36	3	342 81	..	.....	3	342 81	..	.....	..	.....	.....	2,394 17
20	Spokes, staves, and heads manufacturing	3	100 68	1	141 88	..	.....	1	141 88	..	.....	..	.....	.....	242 56
21	Wood-toy manufacturing	4	229 47	1	462 85	..	.....	1	462 85	..	.....	..	.....	.....	692 32
		258	$ 8,821 96	25	$ 4,121 20	6	$ 4,507 77	25	$ 8,629 07	2	$ 6,937 36	1	$ 75 00	$ 7,012 36	$ 24,463 39
	Class No. 3.														
1	Coal-mining	840	$ 55,517 28	28	$15,887 12	8	$ 5,353 71	28	$21,240 83	13	$46,101 28	10	$ 750 00	$46,851 28	$123,609 39
	Class No. 4.														
4	Sand, shale, clay, and gravel pits	4	$ 90 78	..	.....	..	.....	..	.....	..	.....	..	.....	.....	$ 90 78
6	Concentration of ore by water	...	.....	..	.....	..	.....	..	.....	2	$ 8,288 39	4	$ 300 00	$ 8,588 39	8,588 39
7	Tiles, terra-cotta, sewer-pipe, earthenware, roof-tiles	4	261 51	..	.....	..	.....	..	.....	..	.....	..	.....	.....	261 51
10A	Lime-kilns (with quarry)	2	40 29	..	.....	..	.....	..	.....	..	.....	..	.....	.....	40 29
11	Metal-mining	638	42,605 36	28	$ 7,674 72	9	$16,577 48	30	$24,252 20	9	19,760 65	7	525 00	20,285 65	87,143 21
11A	Placer-mining (surface)	4	366 07	..	.....	..	.....	..	.....	1	4,476 73	..	.....	4,476 73	4,842 80
12	Monuments, lettering or setting	4	324 56	..	.....	..	.....	..	.....	..	.....	..	.....	.....	324 56
13	Quarrying	8	522 39	..	.....	..	.....	..	.....	..	.....	..	.....	.....	522 39
15	Stone dressing or cutting	5	159 99	..	.....	..	.....	..	.....	..	.....	..	.....	.....	159 99
16	Reduction of ores and smelting	9	2,363 86	2	280 14	..	.....	2	280 14	..	.....	..	.....	.....	2,644 00
17	Brick-manufacturing, including clay-digging operations	8	356 53	..	.....	..	.....	..	.....	..	.....	..	.....	.....	356 53
		686	$ 47,091 34	30	$ 7,954 86	9	$16,577 48	32	$24,532 34	12	$32,525 77	11	$ 825 00	$33,350 77	$104,974 45

	Class No. 5.														
1	Auto-repairing	67	2,830 26	2	345 74	..	.....	2	345 74	..	.....	..	.....	.....	3,176 00
2	Iron-bed manufacturing	1	27 75	..	.....	..	.....	..	.....	..	.....	..	.....	.....	27 75
3	Blacksmith-shops	15	731 40	1	264 42	..	.....	1	264 42	..	.....	..	.....	.....	995 82
4	Nuts, bolts, nails, and spikes manufacturing (cold process)	2	51 58	..	.....	..	.....	..	.....	..	.....	..	.....	.....	51 58
6	Can-manufacturing (no hand-feed stamping)	4	356 70	2	169 21	..	.....	2	169 21	..	.....	..	.....	.....	525 91
7	Can-manufacturing (hand-feed stamping)	33	853 50	1	40 19	..	.....	1	40 19	..	.....	..	.....	.....	893 69
8A	Boiler-manufacturing	32	1,547 58	..	.....	..	.....	..	.....	1	4,671 27	..	.....	4,671 27	6,218 85
9	Iron and steel foundry	54	2,400 34	2	208 49	..	.....	2	208 49	..	.....	..	.....	.....	2,608 83
10	Stove and furnace manufacturing and installation	3	39 25	..	.....	..	.....	..	.....	..	.....	..	.....	.....	39 25
11	Machine-shops	83	2,472 07	4	425 24	1	195 13	4	620 37	..	.....	..	.....	.....	3,092 44
12	Iron, steel, and metal products manufacturing (N.E.S.)	10	331 27	..	.....	..	.....	..	.....	..	.....	..	.....	.....	331 27
12A	Iron and steel manufacturing (N.E.S.)	2	247 24	1	288 55	..	.....	1	288 55	..	.....	..	.....	.....	535 79
12B	Babbitt-metal manufacturing	1	2 88	..	.....	..	.....	..	.....	..	.....	..	.....	.....	2 88
13	Metalware (small) manufacturing	1	11 00	..	.....	..	.....	..	.....	..	.....	..	.....	.....	11 00
15	Rolling-mills	6	155 04	..	.....	..	.....	..	.....	..	.....	1	75 00	75 00	230 04
16	Sheet-metal works (construction, erection, and repair)	12	689 10	1	111 77	..	.....	1	111 77	..	.....	..	.....	.....	800 87
		326	$ 12,746 96	14	$ 1,853 61	1	$ 195 13	14	$ 2,048 74	1	$ 4,671 27	1	75 00	$ 4,746 27	$ 19,541 97
	Class No. 6.														
1	Tent and awning manufacturing	5	$ 196 16	..	.....	..	.....	..	.....	..	.....	..	.....	.....	$ 196 16
2A	Bakeries (with delivery)	8	557 06	..	.....	..	.....	..	.....	..	.....	..	.....	.....	557 06
2B	Bakeries (no delivery)	2	36 68	..	.....	..	.....	..	.....	..	.....	..	.....	.....	36 68
3	Confectionery-manufacturing	16	330 11	1	$ 10 02	..	.....	1	$ 10 02	..	.....	..	.....	.....	340 13
3A	Biscuit-manufacturing	6	213 50	..	.....	..	.....	..	.....	..	.....	..	.....	.....	213 50
4	Liquors and beverages manufacturing, including bottling and delivery	38	779 53	..	.....	..	.....	..	.....	..	.....	..	.....	.....	779 53
5	Butcher-shops (without delivery)	34	679 62	..	.....	..	.....	..	.....	..	.....	..	.....	.....	679 62
7	Canning and packing fruits or vegetables	34	874 33	1	108 81	..	.....	1	108 81	..	.....	..	.....	.....	983 14
8	Teaming, cartage, warehousing, and storage	35	1,732 66	2	877 28	2	$ 1,728 84	2	2,606 12	..	.....	2	$ 150 00	.....	4,488 78
9	Compounds (N.E.S.) manufacturing	3	189 50	1	194 85	1	736 95	1	931 80	1	$ 2,778 95	..	.....	$ 2,778 95	3,900 25
11	Cleaning and dyeing	2	66 55	..	.....	..	.....	..	.....	..	.....	..	.....	.....	66 55
12	Cloth, textiles, or clothing manufacturing	9	120 61	1	80 56	..	.....	1	80 56	..	.....	..	.....	.....	201 17
13A	Coal and wood yard (away from mill, with saw)	26	836 14	1	41 71	..	.....	1	41 71	..	.....	..	.....	.....	877 85
13B	Coal and wood yard operation (away from mill, no saw)	16	1,003 54	..	.....	..	.....	..	.....	..	.....	..	.....	.....	1,003 54
14	Cold-storage plants (no teaming)	1	23 10	..	.....	..	.....	..	.....	..	.....	..	.....	.....	23 10
15	Cold-storage plants (with teaming)	4	80 01	..	.....	..	.....	..	.....	..	.....	..	.....	.....	80 01
16	Creameries, including delivery	22	646 23	..	.....	..	.....	..	.....	..	.....	..	.....	.....	646 23
18	Elevators (operation)	7	431 01	..	.....	..	.....	..	.....	..	.....	..	.....	.....	431 01
21	Flour-milling	10	689 19	2	361 26	..	.....	2	361 26	..	3,860 05	..	.....	3,860 05	4,910 50
22	Food-products manufacturing (N.E.S.)	57	2,812 79	2	70 47	..	.....	2	70 47	..	.....	1	75 00	75 00	2,958 26
23	Handling of grain	5	384 63	..	.....	..	.....	..	.....	..	.....	..	.....	.....	384 63
26	Ice-manufacturing (with delivery)	5	60 40	..	.....	..	.....	..	.....	..	.....	..	.....	.....	60 40
27	Janitors (at request)	11	532 68	3	373 85	1	195 13	3	568 98	1	4,421 65	..	.....	4,421 65	5,523 31
28	Jewellery manufacturing	2	98 99	..	.....	..	.....	..	.....	..	.....	..	.....	.....	98 99
29	Knitting-mills	3	34 20	..	.....	..	.....	..	.....	..	.....	..	.....	.....	34 20
31	Laundries (power)	26	1,263 83	2	3,444 90	..	.....	2	3,444 90	3	9,907 89	3	225 00	10,132 89	14,841 62
33	Leather-shoes (manufacturing or repairing)	4	22 86	..	.....	..	.....	..	.....	..	.....	..	.....	.....	22 86
34	Leather-goods manufacturing	3	22 38	..	.....	..	.....	..	.....	..	.....	..	.....	.....	22 38
36	Oil refining and distribution	18	730 44	1	29 39	..	.....	1	29 39	1	5,279 64	1	75 00	5,354 64	6,114 47
37	Packing-houses (slaughtering, with or without teaming)	20	409 30	..	.....	..	.....	..	.....	..	.....	..	.....	.....	409 30
38	Packing-houses (slaughtering, with teaming)	7	191 95	..	.....	..	.....	..	.....	..	.....	..	.....	.....	191 95
38A	Packing-houses (no slaughtering, no teaming)	2	45 80	..	.....	..	.....	..	.....	..	.....	..	.....	.....	45 80
39	Paint-manufacturing	9	267 53	..	.....	..	.....	..	.....	..	.....	..	.....	.....	267 53
	Carried forward	450	$16,363 31	17	$5,593 10	4	$ 2,660 92	17	$ 8,254 02	6	$26,248 18	7	$ 525 00	$26,773 18	$ 51,390 51

TABLE A.—STATEMENT SHOWING TOTAL AMOUNT PAID IN EACH INDUSTRY ON ACCOUNT OF ALL FINALLED ACCIDENTS DURING 1919—*Continued.*

Sub-class.	Industry.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.						FATAL ACCIDENTS.					ALL FINAL AWARDS.
				CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.		PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	
		No. of Claims.	Amount of Compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		Total Amount.
	Brought forward	450	$ 16,363 31	17	$ 5,593 10	4	$ 2,660 92	17	$ 8,254 02	6	$26,248 18	7	$ 525 00	$26,773 18	$ 51,390 51
	Class No. 6—Continued.														
40	Tar, tarred, pitched, or asphalted paper manufacturing	5	$ 242 96	..	.....	..	.....	..	.....	..	.....	..	.....	.....	$ 242 96
41	Printing, lithographing, and engraving	22	1,002 89	4	$ 1,095 64	1	$ 1,142 88	4	$ 2,238 52	..	.....	..	.....	.....	3,241 41
42	Rubber or rubber-goods manufacturing	4	97 11	1	150 42	..	.....	1	150 42	..	.....	..	.....	.....	247 53
43	Stationery-manufacturing	10	215 28	3	148 09	1	195 13	3	343 22	..	.....	..	.....	.....	558 50
44	Upholstering	2	244 65	..	.....	..	.....	..	.....	..	.....	..	.....	.....	244 65
45	Wholesalers (with or without teaming)	41	1,592 57	1	106 53	..	.....	1	106 53	..	.....	..	.....	.....	1,699 10
		534	$19,758 77	26	$ 7,093 78	6	$ 3,998 93	26	$11,092 71	6	$26,248 18	7	$ 525 00	$26,773 18	$ 57,624 66
	Class No. 7.														
2	Bridge-building (steel)	1	$ 33 51	1	$ 33 63	..	.....	1	$ 33 63	..	.....	..	.....	.....	$ 67 14
3	Bridge-building (wooden)	20	749 49	1	40 16	..	.....	1	40 16	..	.....	..	.....	.....	789 65
4	Building construction (N.E.S.)	101	6,851 65	7	2,740 44	3	$ 1,632 06	7	4,372 50	1	$ 3,966 42	1	$ 75 00	$4,041 42	15,265 57
5	Structural carpentry	36	1,477 70	2	577 30	..	.....	2	577 30	..	.....	..	.....	.....	2,055 00
6	Reservoirs, dams, or flumes (construction with blasting)	1	34 38	..	.....	..	.....	..	.....	..	.....	..	.....	.....	34 38
7	Reservoirs (construction without blasting)	4	210 79	..	.....	..	.....	..	.....	..	.....	..	.....	.....	210 79
8	Dredging	12	559 18	2	191 59	..	.....	2	191 59	..	.....	..	.....	.....	750 77
9	Dry-docks, construction of	2	47 03	..	.....	..	.....	..	.....	..	.....	..	.....	.....	47 03
10	Electric wiring or building	3	28 70	..	.....	..	.....	..	.....	..	.....	..	.....	.....	28 70
11	Steam-railways (construction and operation)	87	3,789 63	1	22 41	..	.....	1	22 41	1	1,406 84	1	75 00	1,481 84	5,293 88
12	Floor-laying (mosaic, tile, or terrazzo)	2	40 27	..	.....	..	.....	..	.....	..	.....	..	.....	.....	40 27
14	Plumbing and heating	22	873 03	..	.....	..	.....	..	.....	..	.....	..	.....	.....	873 03
15	House-moving	2	29 70	..	.....	..	.....	..	.....	1	2,249 49	..	.....	2,249 49	2,279 19
15A	House-wrecking	10	1,335 02	..	.....	..	.....	..	.....	..	.....	1	75 00	75 00	1,410 02
16	Installation of boilers, engines, machinery, marine elevators, iron stairs, etc.	7	412 52	..	.....	..	.....	..	.....	..	.....	..	.....	.....	412 52
18	Irrigation-works, construction of	3	115 23	1	29 78	..	.....	1	29 78	..	.....	..	.....	.....	145 01
20A	Marine railway operation, including repair of vessels not exceeding 50 tons weight	7	235 04	..	.....	..	.....	..	.....	1	1,443 90	1	75 00	1,518 90	1,753 94
20B	Marine-railway operation, including repair of vessels exceeding 50 tons weight	17	670 57	2	365 00	2	1,126 58	2	1,491 58	..	.....	..	.....	.....	2,162 15
21	Mason-work	1	5 95	..	.....	..	.....	..	.....	..	.....	..	.....	.....	5 95
22	Painting	7	457 98	..	.....	..	.....	..	.....	..	.....	..	.....	.....	457 98
23	Painting high steel or other structures	6	1,310 83	..	.....	..	.....	..	.....	..	.....	..	.....	.....	1,310 83
26	Pile-driving	16	925 16	1	154 53	..	.....	1	154 53	..	.....	..	.....	.....	1,079 69
27	Plastering	2	127 05	..	.....	..	.....	..	.....	..	.....	..	.....	.....	127 05
29	Road-making (with blasting)	10	533 06	..	.....	..	.....	..	.....	..	.....	..	.....	.....	533 06
30	Road-making (without blasting)	9	207 75	..	.....	..	.....	..	.....	1	2,610 47	..	.....	2,610 47	2,818 22
31	Roofing	2	18 15	..	.....	..	.....	..	.....	1	2,055 87	..	.....	2,055 87	2,074 02
35	Sewers (new construction or extension of plant)	1	718 08	1	351 40	1	571 44	1	922 84	..	.....	..	.....	.....	1,640 92
39	Steel-ship building	620	27,690 08	31	4,703 54	9	6,384 42	31	11,087 96	5	18,224 30	4	300 00	18,524 30	57,302 34
39A	Street-paving	1	82 50	..	.....	..	.....	..	.....	..	.....	..	.....	.....	82 50
41	Tunnelling or well-digging	1	4 68	..	.....	..	.....	..	.....	..	.....	..	.....	.....	4 68

42	Waterworks construction or extension of plant.	2	72 05	..	.....	..	.....	..	.....	..	.....	..	.....	.....	72 05
44	Waterworks (operation and maintenance, including new connections)	1	4 40	1	203 28	1	292 69	1	495 97	..	.....	..	.....	.....	500 37
45	Well-drilling	1	10 82	..	.....	..	.....	..	.....	..	.....	..	.....	.....	10 82
46	Window-cleaning	2	263 38	..	.....	..	.....	..	.....	..	.....	..	.....	.....	263 38
48	Wooden-ships construction	709	35,938 70	21	5,610 91	4	2,394 27	21	8,005 18	6	18,898 42	5	375 00	19,273 42	63,217 30
49	Boat-manufacturing (less than 50 tons weight)	10	310 19	..	.....	..	.....	..	.....	..	.....	..	.....	.....	310 19
	Class No. 8.	1,738	$ 86,174 25	72	$15,023 97	20	$12,401 46	72	$27,425 43	17	$50,855 71	13	$ 975 00	$51,830 71	$165,430 39
1	Auto transportation (passenger)	4	$ 174 51	..	.....	..	.....	..	.....	..	.....	..	.....	.....	$ 174 51
2	Electric light and power plants (lines and appliances, construction and operation)	2	106 26	..	.....	..	.....	..	.....	..	.....	..	.....	.....	106 26
4	Electric railways (operation and maintenance)	55	1,931 46	1	$ 196 53	..	.....	1	$ 196 53	2	$ 8,175 62	2	$ 150 00	$ 8,325 62	10,453 61
6A	Gasworks (operation and maintenance, including new connections)	15	309 40	..	.....	..	.....	..	.....	..	.....	..	.....	.....	309 40
10	Railways (express and delivery)	1	1,274 33	..	.....	..	.....	..	.....	..	.....	..	.....	.....	1,274 33
11	Steam-railways (construction and operation)	32	8,830 74	7	4,571 95	3	$ 1,768 04	7	6,339 99	..	.....	..	.....	.....	15,170 73
13A	Telephone systems (operation only)	6	178 34	..	.....	..	.....	..	.....	..	.....	..	.....	.....	178 34
13B	Telephone systems (line-work and construction)	11	744 85	..	.....	..	.....	..	.....	..	.....	..	.....	.....	744 85
14	Theatre stage (operation)	3	207 43	..	.....	..	.....	..	.....	..	.....	..	.....	.....	207 43
	Class No. 9.	129	$ 13,757 32	8	$ 4,768 48	3	$ 1,768 04	8	$ 6,536 52	2	$ 8,175 62	2	$ 150 00	$ 8,325 62	$ 38,619 46
1	Navigation	59	$ 3,881 55	3	$ 1,055 23	1	$ 478 57	3	$ 1,533 80	..	.....	..	.....	.....	$ 5,415 35
2	Stevedoring	252	19,196 80	5	922 87	1	563 34	5	1,486 21	2	$ 5,482 55	3	$ 225 00	$ 5,707 55	26,390 56
3	Wharves (operation)	15	1,459 54	1	32 90	..	.....	1	32 90	..	.....	..	.....	.....	1,492 44
4	Salving	3	62 96	..	.....	..	.....	..	.....	..	.....	..	.....	.....	62 96
	Class No. 10.	329	$ 24,600 85	9	$ 2,011 00	2	$ 1,041 91	9	$ 3,052 91	2	$ 5,482 55	3	$ 225 00	$ 5,707 55	$ 33,361 31
1	Canadian Pacific Rly. Co. (construction and operation)	305	$ 19,188 03	20	$ 4,646 72	6	$ 5,381 29	20	$10,028 01	10	$34,379 80	12	$ 865 00	$35,244 80	$ 64,460 84
2	Canadian Pacific Ocean Services, Ltd	28	1,673 51	1	275 51	..	.....	1	275 51	29	88,686 64	1	75 00	88,761 64	90,710 66
3A	Consolidated Mining & Smelting Co. of Canada, Ltd. (metal-mining)	119	4,735 11	4	558 54	1	704 18	4	1,262 72	..	.....	1	75 00	75 00	6,072 83
3B	Consolidated Mining & Smelting Co. of Canada, Ltd. (smelting)	130	7,404 66	2	450 00	2	1,227 00	2	1,677 00	..	.....	2	150 00	150 00	9,231 66
3C	Consolidated Mining & Smelting Co. of Canada, Ltd. (reduction works, no heat)	15	416 16	..	.....	..	.....	..	.....	..	.....	..	.....	.....	416 16
4	Dominion Express Co	6	82 85	..	.....	..	.....	..	.....	..	.....	..	.....	.....	82 85
5	Esquimalt & Nanaimo Rly. Co. (construction and operation)	15	1,484 96	1	754 73	1	2,184 37	1	2,939 10	..	.....	..	.....	.....	4,424 06
6	Kettle Valley Rly. Co. (construction and operation)	22	1,002 66	1	88 64	..	.....	1	88 64	1	3,922 79	2	150 00	4,072 79	5,164 09
7	West Kootenay Power & Light Co	6	151 82	..	.....	..	.....	..	.....	..	.....	..	.....	.....	151 82
8	Coast Copper Co	1	26 02	..	.....	..	.....	..	.....	..	.....	..	.....	.....	26 02
	Class No. 11.	647	$ 36,165 78	29	$ 6,774 14	10	$ 9,496 84	29	$16,270 98	30	126,989 23	18	$ 1,315 00	128,304 23	$180,740 99
1	Canadian Express Co	2	$ 66 88	..	.....	..	.....	..	.....	..	.....	..	.....	.....	$ 66 88
2	Grand Trunk Pacific Coast S.S. Co	1	3 77	..	.....	..	.....	..	.....	..	.....	..	.....	.....	3 77
4	Grand Trunk Pacific Rly. Co. (construction, &c.	42	4,130 39	1	$ 37 17	..	.....	1	$ 37 17	2	$ 2,802 44	..	.....	$ 2,802 44	6,970 00
5B	Grand Trunk Pacific Telegraph Co. (line-work and construction)	3	108 19	..	.....	..	.....	..	.....	..	.....	..	.....	.....	108 19
	Class No. 12.	48	$ 4,309 23	1	$ 37 17	..	.....	1	$ 37 17	2	$ 2,802 44	..	.....	$ 2,802 44	$ 7,148 84
1	Canadian Northern Pacific Rly. Co. (construction and operation)	108	$ 5,587 95	7	$ 1,652 08	4	$ 1,819 00	7	$ 3,471 08	..	.....	1	$ 75 00	$ 75 00	$ 9,134 03

TABLE A.—STATEMENT SHOWING TOTAL AMOUNT PAID IN EACH INDUSTRY ON ACCOUNT OF ALL FINALLED ACCIDENTS DURING 1919—*Continued.*

Sub-class.	Industry.	Finalled Temporary Total Disabilities.		Finalled Permanent Partial Disabilities.						Fatal Accidents.					All Final Awards.
				Cash Payments.		Monthly Pensions.		Total P.P.D. Awards.		Pension Awards.		Burial Awards.		Total Fatal Awards.	
		No. of Claims.	Amount of Compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		Total Amount.
	Class No. 13.														
1	Provincial Government employees	119	$ 7,269 41	3	$ 1,131 11	3	$ 3,155 63	4	$ 4,286 74	1	$ 4,606 17	1	$ 75 00	$ 4,681 17	$ 16,237 32
	Class No. 14.														
1	Municipalities (park-men)	18	$ 661 61	1	$ 91 41	..	.....	1	$ 91 41	1	$ 3,903 66	1	$ 75 00	$ 3,978 66	$ 4,731 68
2	Municipalities (fire departments, paid)	35	1,344 46	..	.....	..	.....	..	.....	..	.....	1	75 00	75 00	1,419 46
3	Municipalities (police departments)	9	949 16	..	.....	..	.....	..	.....	..	.....	..	.....	.....	949 16
4	Municipalities (street-cleaning and scavenging)	8	303 91	..	.....	..	.....	..	.....	..	.....	..	.....	.....	303 91
5A	Municipalities (operation and maintenance, including new connections)	6	464 88	1	64 58	..	.....	1	64 58	..	.....	..	.....	.....	529 46
5B	Municipalities (waterworks, construction or extension of plant)	2	213 40	..	.....	..	.....	..	.....	..	.....	..	.....	.....	213 40
7A	Municipalities (sewers, operation and maintenance, including new connections)	5	291 57	1	140 27	..	.....	1	140 27	..	.....	..	.....	.....	431 84
7B	Municipalities (sewers, new construction or extension of plant)	2	91 48	..	.....	..	.....	..	.....	..	.....	..	.....	.....	91 48
8A	Municipalities (road-making, without blasting)	26	1,298 86	1	132 06	1	$ 382 81	1	514 87	..	.....	..	.....	.....	1,813 73
8B	Municipalities (road-making, with blasting)	4	107 11	..	.....	..	.....	..	.....	..	.....	..	.....	.....	107 11
9	Municipalities (street-paving)	3	217 54	..	.....	..	.....	..	.....	..	.....	..	.....	.....	217 54
12	Municipalities (electric light and power plants, lines and appliances, construction and operation)	7	535 27	1	140 22	..	.....	1	140 22	..	.....	..	.....	.....	675 49
14	Municipalities (navigation)	3	38 32	..	.....	..	.....	..	.....	..	.....	..	.....	.....	38 32
15	Municipalities (School Boards)	3	88 89	..	.....	..	.....	..	.....	..	.....	..	.....	.....	88 89
	Class No. 15.	131	$ 6,606 46	5	$ 568 54	1	$ 382 81	5	$ 951 35	1	$ 3,903 66	2	$ 150 00	$ 4,053 66	$ 11,611 47
1	Canning and packing of fish	101	$ 5,586 30	5	$ 749 74	2	$ 518 46	5	$ 1,268 20	3	$ 10,277 14	1	$ 25 00	$ 10,302 14	$ 17,156 64
2	Fish oil and fertilizer manufacturing	1	56 10	..	.....	..	.....	..	.....	..	.....	..	.....	.....	56 10
4	Fishing or whaling	30	1,084 15	2	210 89	..	.....	2	210 89	..	.....	2	150 00	150 00	1,445 04
	Class No. 16.	132	$ 6,726 55	7	$ 960 63	2	$ 518 46	7	$ 1,479 09	3	$ 10,277 14	3	$ 175 00	$ 10,452 14	$ 18,657 78
1	Explosive manufacturing	24	$ 1,645 31	1	$ 268 72	1	$ 1,064 43	1	$ 1,333 15	1	$ 4,223 65	1	$ 75 00	$ 4,298 65	$ 7,277 11
4	Chemical-manufacturing (N.E.S.)	8	522 03	..	.....	..	.....	..	.....	..	.....	..	.....	.....	522 03
	Class No. 17.	32	$ 2,167 34	1	$ 268 72	1	$ 1,064 43	1	$ 1,333 15	1	$ 4,223 65	1	$ 75 00	$ 4,298 65	$ 7,799 14
1	Retailers' employees, on request (where more than 5 affected, this rate includes deliveries)	14	$ 866 48	..	.....	..	.....	..	.....	1	$ 3,583 20	1	$ 75 00	$ 3,658 20	$ 4,524 68
2	Deliveries	87	2,636 85	1	$ 244 78	..	.....	1	$ 244 78	..	.....	..	.....	.....	2,881 63
	Class No. 18.	101	$ 3,503 33	1	$ 244 78	..	.....	1	$ 244 78	1	$ 3,583 20	1	$ 75 00	$ 3,658 20	$ 7,406 31
1	Great Northern Rly. Co	28	$ 1,284 09	1	$ 26 22	..	.....	1	$ 26 22	2	$ 2,139 50	1	$ 75 00	$ 2,214 50	$ 3,524 81
	Class No. 19.														
1	Dominion Government	5	$ 360 60	..	.....	..	.....	..	.....	..	.....	..	.....	.....	$ 360 60

TABLE A 1.—SUMMARY BY CLASSES OF TABLE A.

Class.	FINALLED TEMPORARY TOTAL DISABILITIES.		FINALLED PERMANENT PARTIAL DISABILITIES.						FATAL ACCIDENTS.					ALL FINAL AWARDS.
			CASH PAYMENTS.		MONTHLY PENSIONS.		TOTAL P.P.D. AWARDS.		PENSION AWARDS.		BURIAL AWARDS.		TOTAL FATAL AWARDS.	
	No. of Claims.	Amount of Compensation paid.	No. of Claims.	Amount.	No. of Claims.	Reserve.	No. of Claims.	Total P.P.D. Cost.	No.	Reserve.	No.	Amount.		Total Amount.
Class No. 1	3,051	$196,630 03	217	$ 47,743 32	65	$ 49,900 65	217	$ 97,643 97	39	$132,973 38	64	$4,549 50	$137,522 88	$431,796 88
Class No. 2	258	8,821 96	25	4,121 30	6	4,507 77	25	8,629 07	2	6,937 36	1	75 00	7,012 36	24,463 39
Class No. 3	840	55,517 28	28	15,887 12	8	5,353 71	28	21,240 83	13	46,101 28	10	750 00	46,851 28	123,609 39
Class No. 4	686	47,091 34	30	7,954 86	9	16,577 48	32	24,532 34	12	32,525 77	11	825 00	33,350 77	104,974 45
Class No. 5	326	12,746 96	14	1,853 61	1	195 13	14	2,048 74	1	4,671 27	1	75 00	4,746 27	19,541 97
Class No. 6	534	19,758 77	26	7,093 78	6	3,998 93	26	11,092 71	6	26,248 18	7	525 00	26,773 18	57,624 66
Class No. 7	1,738	86,174 25	72	15,023 97	20	12,401 46	72	27,425 43	17	50,855 71	13	975 00	51,830 71	165,430 39
Class No. 8	129	13,757 32	8	4,768 48	3	1,768 04	8	6,536 52	2	8,175 62	2	150 00	8,325 62	28,619 46
Class No. 9	329	24,600 85	9	2,011 00	2	1,041 91	9	3,052 91	2	5,482 55	3	225 00	5,707 55	33,361 31
Class No. 10	647	36,165 78	29	6,774 14	10	9,496 84	29	16,270 98	30	126,989 23	18	1,315 00	128,304 23	180,740 99
Class No. 11	48	4,309 23	1	37 17	..	.....	1	37 17	2	2,802 44	..	.....	2,802 44	7,148 84
Class No. 12	108	5,587 95	7	1,652 08	4	1,819 00	7	3,471 08	....	.....	1	75 00	75 00	9,134 03
Class No. 13	119	7,269 41	3	1,131 11	3	3,155 63	4	4,286 74	1	4,606 17	1	75 00	4,681 17	16,237 32
Class No. 14	131	6,606 46	5	568 54	1	382 81	5	951 35	1	3,903 66	2	150 00	4,053 66	11,611 47
Class No. 15	132	6,726 55	7	960 63	2	518 46	7	1,479 09	3	10,277 14	3	175 00	10,452 14	18,657 78
Class No. 16	32	2,167 34	1	268 72	1	1,064 43	1	1,333 15	1	4,223 65	1	75 00	4,298 65	7,799 14
Class No. 17	101	3,503 33	1	244 78	..	.....	1	244 78	1	3,583 20	1	75 00	3,658 20	7,406 31
Class No. 18	28	1,284 09	1	26 22	..	.....	1	26 22	2	2,139 50	1	75 00	2,214 50	3,524 81
Class No. 19	5	360 60	..	.....	..	.....	..	.....	...	.....	..	.....	.....	360 60
Totals	9,242	$539,079 50	484	$118,120 83	141	$112,182 25	487	$230,303 08	134	$472,496 11	140	$10,164 50	$482,660 61	$1,252,043 19

TABLE B.—ANALYSIS OF 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS.

Sub-class.	Industry.	No. of accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.				Nationality.													
					Male.	Female.	Married.	Single.	Unknown.	Receiving other Benefits.	British.	Canadian.	American.	French.	Italian.	Russian.	German.	Austrian.	Chinese.	Japanese.	Norwegian.	Swedish.	Native of India.	Others.
	Class No. 1.																							
1	Creosoting-works	7	$ 928 19	$3 60	7	....	3	3	1	....	5	2	..	....	....	....	....	....	....	....	....	....	....	....
2	Lath-mills, including yards and delivery	9	266 73	3 35	9	....	5	4	....	....	3	1	....	..	1	....	....	....	2	1	....	....	....	1
3	Lumbering, including logging, river-driving, rafting or booming	1,314	228,857 12	5 19	1,311	3	413	848	53	33	434	277	133	8	22	110	2	20	38	106	38	85	7	34
4	Pulp and paper manufacturing	241	24,662 79	4 80	241	....	95	109	37	10	71	35	20	1	13	13	1	2	21	50	2	3	2	7
5	Sawmills, including yards and delivery	1,088	105,090 02	3 92	1,087	1	677	320	91	28	383	129	41	3	15	25	2	7	179	219	7	18	46	14
6	Shingle-mills, including yards and delivery	304	36,995 61	4 70	304	....	183	104	17	5	78	35	13	1	...	....	2	....	158	12	....	3	1	1
7	Logging-railways (operation, maintenance, and construction)	88	16,069 87	5 24	88	...	19	63	6	1	27	20	13	2	4	7	1	3	2	...	1	4	3	1
		3,051	$412,870 33	.....	3,047	4	1,395	1,451	205	77	1,001	499	220	15	55	155	8	32	400	388	48	113	59	58
	Class No. 2.																							
1	Artificial limbs	1	$ 320 16	$6 67	1	....	1	.....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
4	Broom and mop manufacturing	4	345 60	1 93	3	1	1	3	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
5	Carpentering (shop only)	4	436 95	5 46	4	....	2	2	....	1	4	....	....	....	....	....	....	....	....	....	....	....	....	....
6	Coffins, wooden, manufacturing	8	1,140 59	4 62	8	....	3	4	1	....	6	....	1	....	....	....	....	....	....	1	....	....	....	....
7	Cooperage (no stave or head manufacturing)	6	579 85	4 03	6	....	4	1	1	....	2	1	....	....	....	....	....	....	3	....	....	....	....	....
8	Veneer and excelsior manufacturing	10	435 91	3 22	9	1	3	6	1	2	7	2	....	....	....	....	....	....	....	....	....	....	....	1
9	Furniture-manufacturing	17	1,245 29	4 25	17	....	12	5	....	....	15	1	1	....	....	....	....	....	....	....	....	....	....	....
13	Wood-working plants, planing-mills	90	6,757 76	3 46	90	....	40	43	7	11	45	15	6	....	1	....	....	....	8	13	....	1	1	....
14	Sash and door manufacturing	25	1,697 40	3 36	25	....	10	14	1	2	13	7	1	....	....	....	....	....	1	2	....	....	....	1
16	Vehicle-manufacture	4	373 32	5 00	4	....	4	.....	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
17	Wooden-box manufacturing	82	4,515 87	3 40	80	2	22	55	5	10	47	12	1	....	1	....	....	....	3	10	....	5	2	1
20	Spokes, staves, and heads manufacturing	3	220 85	4 18	3	....	3	.....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
21	Wood-toy manufacturing	4	461 80	3 23	3	1	3	1	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
		258	$18,531 35	.....	253	5	108	134	16	26	151	41	11	....	2	....	....	....	15	26	....	6	3	3
	Class No. 3.																							
1	Coal-mining	840	$117,575 75	$ 5 22	840	....	516	311	13	268	450	77	10	5	76	32	8	43	78	34	2	....	....	25
	Class No. 4.																							
4	Sand, shale, clay, and gravel pits	4	$ 122 65	$4 24	4	....	4	.....	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....
7	Tiles, terra-cotta, sewer-pipe earthenware, roof-tiles	4	535 87	4 88	4	....	3	1	....	1	1	1	....	....	1	....	....	....	....	....	....	1	....	....
10A	Lime-kilns (with quarry)	2	96 50	3 88	2	....	1	1	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....
11	Metal-mining	638	88,610 82	4 89	637	1	225	401	12	28	257	92	43	....	64	37	2	24	2	14	17	40	....	46
11A	Placer-mining (surface)	4	795 66	6 00	4	....	2	2	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	1
12	Monuments, lettering or setting	4	661 22	5 93	4	....	3	1	....	....	3	....	....	....	1	....	....	....	....	....	....	....	....	....
13	Quarrying	7	672 50	4 05	7	....	3	4	....	....	3	....	....	....	2	....	....	....	1	....	....	....	....	1
15	Stone dressing or cutting	6	784 50	6 30	6	...	4	2	...	....	1	5	....	....	....	....	....	....	....	....	....	....	....	....
16	Reduction of ores and smelting	9	4,133 26	5 01	9	...	2	7	....	....	6	....	1	....	....	....	....	1	....	....	....	....	....	1
17	Brick-manufacturing, including clay-digging operations	8	709 91	5 12	7	1	5	3	....	....	7	....	....	....	....	....	....	....	....	....	....	....	....	1
		686	$ 97,122 89	.....	684	2	252	422	12	29	285	98	44	....	69	37	2	25	4	14	17	41	....	50

	Class No. 5.																								
1	Auto-repairing	67	$ 6,029 88	$4 93	67	....	28	39	....	13	40	23	2	...	1	....	....	....	....	1	....	....	....	....
2	Iron-bed manufacturing	1	58 69	2 73	1	....	.....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
3	Blacksmith-shops	15	1,522 97	4 38	15	....	7	7	1	2	11	2	....	....	....	2	....	....	....	....	....	....	....	....
4	Nuts, bolts, nails, and spikes manufacturing (cold process)	2	117 95	4 03	2	....	1	1	....	....	1	....	....	....	....	....	....	....	....	....	1	....	....	....
6	Can-manufacturing (no hand-feed stamping)	4	687 94	3 26	3	1	2	2	....	....	1	3	....	....	....	....	....	....	....	....	....	....	....	....
7	Can-manufacturing (hand-feed stamping)	33	1,746 58	3 12	21	12	9	24	....	1	14	16	1	....	1	....	....	....	....	....	....	....	....	1
8A	Boiler-manufacturing	32	3,419 40	5 78	32	....	19	12	1	3	95	5	2	....	....	....	....	....	....	....	....	....	....	....
9	Iron and steel foundry	54	5,203 51	4 66	54	....	30	20	4	3	31	5	3	....	11	1	....	2	....	....	....	....	....	1
10	Stoves and furnace manufacturing and installation (N.E.S.)	3	101 00	3 42	3	....	1	1	1	....	1	1	....	....	....	....	....	....	1	....	....	....	....	....
11	Machine-shops	83	5,442 05	4 51	83	....	44	37	2	3	65	12	4	....	....	....	....	1	....	1	....	....	....	....
12	Iron, steel, and metal products manufacturing	10	747 06	4 31	10	....	4	6	...	....	4	2	....	....	2	1	....	....	1	....	....	..	....	....
12A	Iron and steel manufacturing (N.E.S.)	2	482 84	5 55	2	....	1	.. ..	1	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
12B	Babbitt-metal manufacturing	1	10 50	1 75	1	....	.....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
13	Metalware (small) manufacturing	1	21 31	2 50	1	....	.....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
15	Rolling-mills	6	431 81	5 59	6	....	1	5	....	....	2	1	1	....	2	....	....	....	....	....	....	....	....	....
16	Sheet-metal works (construction, erection, & repairing)	12	1,363 41	4 35	12	....	4	8	..	....	8	3	....	....	1	....	....	....	....	....	....	....	....	....
		326	$ 27,386 90	.....	313	13	151	165	10	25	207	74	13	....	18	4	....	3	1	3	1	....	....	2
	Class No. 6.																								
1	Tent and awning manufacturing	5	$ 409 53	$3 07	4	1	2	2	1	....	2	1	1	....	....	....	....	....	....	....	....	....	....	1
2A	Bakeries (with delivery)	8	1,047 62	4 12	8	....	7	1	....	....	7	1	....	....	....	....	....	....	....	....	....	....	....	....
2B	Bakeries (no delivery)	2	87 52	3 47	2	....	1	1	....	....	....	....	....	....	1	....	....	....	1	....	....	....	....	....
3	Confectionery-manufacturing	16	699 01	2 35	9	7	2	14	....	....	12	1	1	....	1	....	....	....	....	1	....	....	....	....
3A	Biscuit-manufacturing	6	452 90	3 22	4	2	1	5	....	....	5	....	....	....	....	....	....	....	1	....	....	....	....	....
4	Liquors and beverages manufacturing, including bottling and delivery	38	1,749 41	4 02	37	1	18	15	5	1	25	6	1	....	6	....	....	....	....	....	....	....	....	....
5	Butcher-shops	34	1,652 96	3 68	32	2	20	12	2	1	23	8	....	....	1	1	....	....	....	1	....	....	....	....
7	Canning and packing fruits and vegetables	34	1,983 63	4 29	24	10	16	17	1	2	25	4	2	1	1	....	....	....	....	1	....	....	....	....
8	Teaming, cartage, warehousing, and storage	35	3,626 45	4 10	35	....	17	17	1	1	21	11	2	....	....	....	1	....	....	....	....	....	....	....
9	Compounds (N.E.S.) manufacturing	3	372 99	2 81	3	....	1	2	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....
11	Cleaning and dyeing	2	142 00	3 50	2	....	.....	2	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
12	Cloth, textiles, or clothing manufacturing	9	288 68	2 40	8	1	3	6	....	....	6	....	....	....	....	....	....	....	2	1	....	....	....	....
13A	Coal and wood yard (away from mill, with saw)	26	1,845 27	4 23	26	....	16	7	3	1	14	4	2	1	....	....	....	....	....	....	....	....	4	1
13B	Coal and wood yard, operation (away from mill, no saw)	16	2,107 62	4 31	16	....	9	6	1	....	11	1	....	..	1	....	....	....	2	....	....	....	1	....
14	Cold-storage plants (no teaming)	1	23 10	4 00	1	....	1	.....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
15	Cold-storage plants (with teaming)	4	186 72	3 51	3	1	2	2	....	....	1	3	....	....	....	....	....	....	....	....	....	....	....	....
16	Creameries, including delivery	22	1,444 32	3 28	22	....	15	7	.. ..	....	14	4	1	....	....	....	....	....	2	1	....	..	....	....
18	Elevators (operating)	7	839 66	2 37	6	1	5	2	....	....	6	1	....	....	....	....	....	....	....	....	....	....	....	....
21	Flour-milling	10	1,374 83	3 98	10	....	8	2	....	....	6	3	....	....	....	....	....	....	1	....	....	....	....	....
22	Food-products manufacturing (N.E.S.)	57	5,835 47	4 11	50	7	38	17	2	....	43	4	3	....	....	....	....	1	3	2	....	....	....	1
23	Handling of grain	5	848 79	3 95	5	....	2	3	....	2	3	1	....	....	....	....	....	....	....	....	....	1	....	....
26	Ice-manufacturing (with delivery)	5	171 85	4 46	5	....	2	3	....	....	3	2	..	....	....	....	....	....	....	....	....	....	....	....
27	Janitors (at request)	11	1,069 05	2 79	11	....	8	3	....	2	9	2	....	....	....	....	....	....	....	....	....	....	....	....
28	Jewellery-manufacturing	2	210 30	5 07	2	...	2	.....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
29	Knitting-mills	3	87 76	2 77	2	1	1	2	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
31	Laundries (power)	26	2,547 97	3 60	14	12	15	11	....	....	15	8	2	....	....	....	....	....	1	....	....	....	....	....
33	Leather-shoes manufacturing or repairing	4	114 44	5 45	4	....	3	1	....	1	4	....	....	....	....	....	....	....	....	....	....	....	....	....
34	Leather-goods manufacturing	3	59 09	4 11	3	....	1	2	....	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....
36	Oil refining and distribution	18	1,597 05	4 95	18	....	11	7	....	1	15	1	....	....	....	....	....	....	1	....	1	....	....	....
37	Packing-houses (slaughtering, with or without teaming)	20	1,034 23	4 26	20	...	15	5	....	....	10	3	2	....	4	....	....	....	1	....	....	....	....	....
38	Packing-houses (no slaughtering, with teaming)	7	438 38	4 70	6	1	2	5	...	....	5	1	....	....	....	....	....	....	1	....	....	....	....	....
38A	Packing-houses (no slaughtering, no teaming)	2	109 61	4 39	2	....	1	1	....	....	1	..	....	....	1	....	....	....	....	....	....	....	....	....
39	Paint-manufacturing	9	573 86	3 01	9	....	4	5	....	....	5	1	....	....	....	1	....	....	....	....	....	1	..	1
40	Tar, tarred, pitch, or asphalted paper manufacturing	5	476 77	2 75	4	1	2	3	....	2	3	1	....	....	1	....	....	....	....	....	....	....	....	....
41	Printing, lithographing, and engraving	22	1,948 17	3 00	20	2	5	16	1	1	20	2	....	....	..	....	....	....	....	....	....	....	....	....
42	Rubber or rubber-goods manufacturing	4	229 48	4 36	4	....	2	2	...	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
	Carried forward	481	$ 37,686 49	.....	431	50	258	206	17	14	328	78	17	2	17	2	1	1	15	8	1	2	5	4

TABLE B.—ANALYSIS OF 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS—*Continued.*

Sub-class.	Industry.	No. of accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.			Receiving other benefits.	Nationality.													
					Male.	Female.	Married.	Single.	Unknown.		British.	Canadian.	American.	French.	Italian.	Russian.	German.	Austrian.	Chinese.	Japanese.	Norwegian.	Swedish.	Native of India.	Others.
	Brought forward	481	$ 37,686 49	.....	431	50	258	206	17	14	328	78	17	2	17	2	1	1	15	8	1	2	5	4
	Class No. 6—Continued.																							
43	Stationery-manufacturing	10	$ 430 66	$ 1 78	3	7	1	9	....	.....	8	2	....	....	....	....	....	....	....	....	....	....	....	....
44	Upholstering	2	470 07	4 23	2	....	1	1	....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	1
45	Wholesalers (with or without teaming)	41	3,525 25	3 94	40	1	19	20	2	1	26	13	....	....	1	....	....	....	1	....	....	....	....	....
	Class No. 7.	534	$ 42,112 47	.....	476	58	279	236	19	15	363	93	17	2	18	2	1	1	16	8	1	2	5	5
2	Bridge-building (steel)	1	$ 120 18	$ 10 45	1	....	1	.....	.....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
3	Bridge-building (wooden)	20	1,744 86	5 71	20	....	7	12	1	2	11	8	....	....	....	....	....	....	....	....	....	....	....	1
4	Building construction (N.E.S.)	101	14,444 25	5 43	101	....	62	36	3	2	68	17	5	....	2	....	....	....	1	1	2	2	....	3
5	Structural carpentry	36	3,289 97	5 36	36	....	17	17	2	1	25	10	....	....	....	....	....	....	....	....	....	1	....	....
6	Reservoirs, dams, or flumes (construction with blasting)	1	77 50	5 00	1	....	.....	1	.....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
7	Reservoirs, dams, or flumes (construction, no blasting)	4	453 90	5 49	4	....	3	1	.....	.....	3	....	1	....	....	....	....	....	....	....	....	....	....	....
8	Dredging	12	1,203 65	4 36	12	....	9	3	.....	.....	9	2	....	....	....	....	....	....	....	....	1	....	....	....
9	Dry-docks, construction of	2	110 68	4 19	2	....	1	1	.....	.....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
10	Electric wiring of buildings	3	112 35	5 53	3	....	2	1	.....	.....	1	2	....	....	....	....	....	....	....	....	....	....	....	....
11	Steam-railways (construction and operation)	87	8,395 42	4 94	87	....	16	69	2	1	36	23	4	....	5	1	1	2	....	....	3	8	....	4
12	Floor-laying (mosaic, tile, or terrazzo)	2	101 50	4 71	2	....	.....	2	.....	.....	1	....	....	....	....	1	....	....	....	....	....	....	....	....
14	Plumbing and heating	22	1,850 65	4 31	22	....	15	6	1	3	17	3	1	....	1	....	....	....	....	....	....	....	....	....
15	House-moving	2	78 00	4 00	2	....	1	1	.....	.....	.....	1	....	....	1	....	....	....	....	....	....	....	....	....
15A	House-wrecking	10	2,563 40	4 87	10	....	5	4	1	.....	6	1	1	1	....	....	....	....	....	....	....	....	....	1
16	Installation of boilers, engines, machinery, marine elevators, iron stairs, or ornamental-iron works	7	973 68	5 52	7	....	3	4	.....	.....	5	1	1	....	....	....	....	....	....	....	....	....	....	....
18	Irrigation-works, construction of	3	247 00	4 00	3	....	1	2	.....	.....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
20A	Marine railway (operating, including repair of vessels not exceeding 50 tons weight)	7	577 90	5 87	7	....	6	1	....	1	6	1	....	....	....	....	....	....	....	....	....	....	....	....
20B	Marine railway (operating, including repair of vessels exceeding 50 tons weight)	17	1,725 80	5 03	17	....	5	8	4	.....	11	4	1	....	1	....	....	....	....	....	....	....	....	....
21	Mason-work	1	20 08	3 09	1	....	1	.....	.....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
22	Painting	7	927 73	4 65	6	1	3	3	1	3	7	....	....	....	....	....	....	....	....	....	....	....	....	....
23	Painting high steel or other high structures	6	2,500 25	5 62	6	....	4	2	.....	.....	4	1	1	....	....	....	....	....	....	....	....	....	....	....
26	Pile-driving	16	2,005 31	6 50	16	....	5	9	2	1	10	3	2	1	....	....	....	....	....	....	....	....	....	....
27	Plastering	2	273 00	7 00	2	....	2	.....	.....	2	1	1	....	....	....	....	....	....	....	....	....	....	....	....
29	Road-making (with blasting)	10	1,152 33	4 89	10	....	4	6	.....	.....	5	1	2	....	....	....	....	....	....	....	1	1	....	....
30	Road-making (without blasting)	9	491 99	4 25	9	....	.....	9	.....	.....	6	3	....	....	....	....	....	....	....	....	....	....	....	....
31	Roofing	2	65 40	5 40	2	....	.....	2	.....	.....	2	....	....	....	....	....	....	....	....	....	....	....	....	....
35	Sewers (new construction or extension of plant)	1	1,315 20	3 20	1	....	1	.....	.....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
38/9	Steel-ship building	620	59,488 84	5 05	620	....	381	222	17	28	441	114	30	....	13	6	....	....	....	....	3	6	....	7
38A	Street-paving	1	168 00	6 00	1	....	1	.....	.....	.....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
41	Tunnelling or well-digging	1	21 25	4 25	1	....	.....	1	.....	.....	.....	....	1	....	....	....	....	....	....	....	....	....	....	....
42	Waterworks (construction or extension of plant)	2	156 50	4 25	2	....	.....	2	.....	.....	1	....	....	....	....	....	....	....	....	....	....	1	....	....
44	Waterworks (operation including new connection)	1	20 00	4 00	1	....	1	.....	.....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....
45	Well-drilling	1	40 02	6 67	1	....	.....	1	.....	.....	.....	....	1	....	....	....	....	....	....	....	....	....	....	....

46	Window-cleaning	2	503 00	4 03	2	....	1	....	1	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....
47	Wooden-ship construction	709	79,006 27	5 57	709	..	444	227	38	89	516	134	19	4	12	4	....	....	....	....	4	14	....	2
48																								
49	Boat-manufacturing (less than 50 tons weight)	10	703 65	4 91	10	....	10	....	....	....	1	3	....	....	....	....	....	....	....	6	....	....	....	....
	Class No. 8.	1738	$ 186,929 51	....	1737	1	1012	653	73	135	1206	333	70	6	35	12	1	2	1	7	14	33	....	18
1	Auto transportation (passenger)	4	$ 247 08	$ 4 63	4	....	3	1	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....
2	Electric light and power plants (lines and appliances, construction and operation)	2	243 00	6 00	2	....	1	....	1	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....
4	Electric railways (operation and maintenance)	55	4,358 13	4 65	55	....	39	16	....	4	39	9	4	....	3	....	....	....	....	....	....	....	....	....
6A	Gasworks (operation and maintenance including new connections)	15	768 71	4 38	15	....	12	3	....	....	13	....	....	....	1	....	....	....	....	....	....	....	....	1
10	Railways (express and delivery)	1	2,329 37	4 13	1	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....
11	Steam-railways (construction and operation)	32	20,083 38	5 35	32	....	30	2	....	....	7	6	6	....	5	....	1	4	....	1	....	1	....	1
13A	Telephone systems (operation only)	6	384 55	4 11	3	3	2	4	....	....	5	....	1	....	....	....	....	....	....	....	....	....	....	....
13B	Telephone systems (line-work and construction)	11	1,120 07	5 59	11	....	6	5	....	2	6	4	1	....	....	....	....	....	....	....	....	....	....	....
14	Theatre stage (operation)	3	435 30	6 29	3	....	3	....	....	1	2	1	....	....	....	....	....	....	....	....	....	....	....	....
	Class No. 9.	129	$ 29,969 59	....	126	3	97	31	1	7	76	21	14	....	9	....	1	4	....	1	....	1	....	2
1	Navigation	59	$ 7,921 52	$ 3 92	59	....	20	38	1	3	39	9	5	....	....	....	....	....	....	2	....	1	....	3
2	Stevedoring	252	38,788 03	4 65	252	....	158	85	9	9	219	13	4	1	5	1	....	....	....	1	2	1	1	4
3	Wharves (operation)	15	3,097 79	4 43	15	....	8	7	....	....	9	2	1	....	....	1	....	....	....	1	1	....	....	....
4	Salving	3	168 67	5 86	3	....	2	1	....	1	3	....	....	....	....	....	....	....	....	....	....	....	....	....
	Class No. 10.	329	$ 49,976 01	....	329	....	188	131	10	13	270	24	10	1	5	2	....	....	....	4	3	2	1	7
1	Canadian Pacific Rly. Co. (construction and operation)	305	$ 40,127 43	$ 4 58	305	....	175	125	5	23	163	65	11	1	9	10	....	4	24	1	5	8	1	3
2	Canadian Pacific Ocean Service, Ltd	28	3,416 62	4 06	27	1	16	12	....	....	18	8	....	....	....	....	....	....	....	....	....	1	..	1
3A	Consolidated Mining & Smelting Co. of Canada, Ltd. (metal-mining)	119	10,047 23	4 17	119	....	43	74	2	2	42	25	7	22	6	1	4	....	....	....	2	10	....	....
3B	Consolidated Mining & Smelting Co. of Canada, Ltd. (smelting)	131	15,435 02	4 32	131	....	72	58	1	9	41	22	7	....	34	7	....	14	....	....	....	3	....	3
3C	Consolidated Mining & Smelting Co. of Canada, Ltd. (reduction-works, no heat)	15	949 12	4 24	15	....	8	7	....	1	5	3	....	....	5	1	....	....	....	....	1	....	....	....
4	Dominion Express Co	6	204 93	2 98	6	....	6	....	....	....	5	1	....	....	....	....	....	....	....	....	....	....	....	....
5	Esquimalt & Nanaimo Rly. Co. (construction and operation)	15	3,213 74	4 16	15	....	13	1	1	....	6	2	....	....	....	....	....	....	7	....	....	....	....	....
6	Kettle Valley Rly. Co. (construction and operation)	22	2,085 29	3 68	22	....	14	8	....	....	9	2	2	....	1	1	....	....	2	1	1	1	....	2
7	West Kootenay Power and Light Co	6	349 67	4 12	6	....	4	2	....	....	3	....	1	....	....	1	....	....	1	....	....	....	....	....
	Class No. 11.	647	$ 75,829 05	....	646	1	351	287	9	35	292	128	28	23	55	21	4	18	34	2	9	23	1	9
1	Canadian Express Co	2	$ 140 80	$ 3 20	2	....	1	1	....	....	....	....	....	....	....	....	....	....	2	..	....	....	....	....
2	Grand Trunk Pacific Coast S.S. Co	1	20 56	4 57	1	....	....	1	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....
4	Grand Trunk Pac. Rly. Co. (construction and operation)	42	10,504 71	5 05	42	....	17	24	1	5	26	7	....	....	....	2	....	1	4	2	....	....	....	....
5B	Grand Trunk Pacific Telegraph Co. (line-work and construction)	3	245 45	5 42	3	....	....	3	....	....	1	1	1	....	....	....	....	....	....	....	....	....	....	....
	Class No. 12.	48	$ 10,911 52	....	48	....	18	29	1	5	28	8	1	....	....	2	....	1	6	2	....	....	....	....
1	Canadian Northern Pacific Rly. Co. (construction and operation	108	$ 12,472 48	$ 4 32	108	....	59	43	6	15	68	22	4	1	3	2	....	4	3	....	....	1	....	....
	Class No. 13.																							
1	Provincial Government employees	119	14,538 71	4 24	119	...	50	67	2	1	98	15	4	....	....	....	....	....	....	....	....	2	....	....

TABLE B.—ANALYSIS OF 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS—*Continued.*

Sub-class.	Industry.	No. of Accidents.	Total Wage Loss.	Average Daily Wage.	Sex.		Conjugal State.			Receiving other Benefits.	Nationality.														
					Male.	Female.	Married.	Single.	Unknown.		British.	Canadian.	American.	French.	Italian.	Russian.	German.	Austrian.	Chinese.	Japanese.	Norwegian.	Swedish.	Native of India.	Others.
	Class No 14.																								
	Municipalities—																								
1	Park-men	17	$ 1,353 04	$4 60	17	....	10	7	....	....	14	2	1	....	....	....	....	....	....	....	....	....	....	....
2	Fire department (paid)	35	2,853 48	3 72	35	....	18	17	....	9	28	7	....	....	....	....	....	....	....	....	....	....	....	....
3	Police departments	9	1,832 09	4 37	9	....	9	....	....	2	7	2	....	....	....	....	....	....	....	....	....	....	....	....
4	Street-cleaning and scavenging	8	650 08	4 03	8	....	8	....	....	....	8	....	....	....	....	....	....	....	....	....	....	....	....	....
5A	Waterworks, including new connections, operation and maintenance	7	981 34	4 06	7	....	6	1	....	....	7	....	....	....	....	....	....	....	....	....	....	....	....	....
5B	Waterworks, construction or extension of plant	2	412 00	4 00	2	....	1	1	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....
7A	Sewers, operation and maintenance, including new connections	5	574 62	4 19	5	....	4	1	....	1	4	1	....	....	....	....	....	....	....	....	....	....	....	....
7B	Sewers, new construction or extension of plant	2	189 47	3 85	2	....	2	....	....	1	2	....	....	....	....	....	....	....	....	....	....	....	....	....
8A	Road-making, without blasting	26	2,802 11	3 89	26	....	19	6	1	....	20	3	1	....	1	....	....	....	....	....	....	....	1	....
8B	Road-making with blasting	4	242 00	3 92	4	....	4	....	....	....	3	1	....	....	....	....	....	....	....	....	....	....	....	....
9	Street-paving	3	446 50	5 75	3	....	3	....	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
12	Electric light and power plants, lines and appliances, construction and operation	7	1,056 82	3 86	7	....	2	4	1	2	6	1	....	....	....	....	....	....	....	....	....	....	....	....
14	Navigation	3	104 83	3 90	3	....	....	3	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
15	School Boards	3	203 62	4 88	3	....	2	1	....	....	3	....	....	....	....	....	....	....	....	....	....	....	....	....
		131	$ 13,702 00	.....	131	....	88	41	2	15	109	18	2	....	1	....	....	....	....	....	....	....	1	....
	Class No. 15.																							
1	Canning and packing of fish	101	$ 11,646 50	$5 52	95	6	3	95	3	....	58	14	7	....	1	2	....	1	7	5	4	....	....	2
2	Fish oil and fertilizer manufacturing	1	111 00	3 00	1	....	1	....	....	....	....	....	....	....	....	....	....	1	....	....	....	....	....	....
4	Fishing or whaling	30	2,337 80	3 86	30	....	18	12	....	1	23	2	1	....	....	....	....	....	3	1	....	....	....	....
		132	$ 14,095 30	.....	126	6	22	107	3	1	81	16	8	....	1	2	....	2	10	6	4	....	....	2
	Class No. 16.																							
1	Explosive-manufacturing	24	$ 3,362 78	$4 08	24	....	14	10	....	3	10	6	....	....	2	....	....	....	4	....	1	....	....	1
4	Chemical-manufacturing	8	981 95	4 15	8	....	5	3	....	....	5	1	....	....	1	....	....	....	1	....	....	....	....	....
	Class No. 17.	32	$ 4,344 73	.....	32	....	19	13	....	3	15	7	....	....	3	....	....	....	5	....	1	..	....	1
1	Retailers' employees, on request (where more than 5 effected, this rate includes deliveries)	14	$ 1,857 83	$4 39	14	....	7	7	....	....	5	5	1	....	1	....	....	1	1	....	....	....	....	....
2	Deliveries	87	5,909 46	4 24	87	....	48	37	2	....	55	19	7	....	....	2	....	....	6	3	3	....	....	2
	Class No. 18.	101	$ 7,767 29	.....	101	....	55	44	2	....	60	24	8	....	1	2	....	1	7	3	3	....	....	2
1	Great Northern Rly. Co	28	$ 4,773 78	$4 94	28	....	17	10	1	1	12	1	10	....	1	1	....	....	2	1	....	....	....	....
	Class No. 19.																							
1	Dominion Government	5	$ 725 05	$4 63	5	....	1	4	....	....	4	1	....	....	....	....	....	....	....	....	....	....	....	....

TABLE B 2.—SUMMARY OF TABLE B.

Total wage loss		$1,141,634 71
Conjugal state—		
Married	4,678	
Single	4,179	
Unknown	385	
		9,242
Sex—		
Male	9,149	
Female	93	
		9,242
Receiving other benefits		651
Nationalities—		
British	4,776	
Canadian	1,490	
American	474	
French	53	
Italian	352	
Russian	274	
German	25	
Austrian	136	
Chinese	582	
Japanese	499	
Scandinavian	327	
Natives of India	70	
Others	184	
		9,242

TABLE C.—STATEMENT SHOWING THE CAUSES OF ALL FINALLED ACCIDENTS DURING 1919.

Causes of Accidents.	Class No. of Temporary Total Disability Accidents.																		T.T.D.		P.P.D.	Fatals.	Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	No. of Accidents.	Payments.			
Prime Movers.																								
Steam-engines	24		1	1		1	1		2	2										32	$ 2,598 67	$ 570 22	$ 12,360 25	$ 15,529 14
Electric motors and dynamos			1	1			1													3	24 65			24 65
Gas or gasolene engines	6						3								2		1			12	420 81	41 22		462 03
Water-wheels, windmills, etc				1																1	1,040 84			1,040 84
Power-transmission Apparatus.																								
Shafts, including pulleys	8	2	1		1	1	1													14	1,441 97	890 43		2,332 40
Set-screws	2			1						1										4	859 67	1,070 86		1,930 53
Belts	23	6		5	5	5	3			10					1	2				60	4,706 89	5,226 57	4,010 05	13,943 51
Chains and sprockets	1		1																	2	249 14	2,658 12		2,907 26
Cables	2						2			1					1					6	527 32	631 59		1,158 91
Gears	6	1		2	4		1	1							1					16	1,134 98	404 06		1,539 04
Power-transmission apparatus (N.E.S.)										1										1	100 03			100 03
Power-driven Machinery.																								
Cement-mixers					1		2													3	31 77			31 77
Glass-making or glass-working machinery						2														2	8 20			8 20
Abrasive wheels	13	4		1	10	5	7			1										41	1,814 63	954 18		2,768 81
Milling or drilling machines	1	2	4	46	6		64			5										128	4,347 86	746 51		5,094 37
Power-hammers		1			2		2													5	195 97			195 97
Lathes		1	1		7			1		1		2								13	379 61	49 90		429 51
Planers (metal-working)	1	2					3													6	616 96	2,886 29		3,503 25
Riveters	1				2		50			1										54	2,330 82			2,330 82
Welding and heat cutting	1				1															2	34 88	38 49		73 37
Can-making machinery					15										5					20	591 53	604 73		1,196 26
Metal-working machinery (N.E.S.)		1	1	5	8	3	5		1	2										26	1,676 52	1,297 83		2,974 35
Shingle-mills	164																			164	10,724 15	14,389 18	4,044 14	29,157 47
Sawmill-machines	234	1	1				1			2										239	12,736 21	15,234 82	14,797 04	42,768 07
Portable power-saws, gasolines, etc	1																			1	19 80			19 80
All other power-saws	6	57		3	2	5	21			1				1						96	3,531 12	2,453 06		5,984 18
Edgers	1						1													2	85 41	432 82		518 23
Planing-mill machinery	5	29	1				13			1				1						50	2,372 62	2,863 34		5,235 96
Cooperage machinery		2																		2	86 38	141 88		228 26
All wood-working machinery (N.E.S.)	1	19			1	2	2		1	1										27	1,394 25	2,836 17		4,230 42
Paper-making machinery	57	1			1	2														61	2,208 12	2,951 70		5,159 82
Printing-presses		1				14														15	835 08	2,000 49		2,835 57
Bookbinding machinery						2														2	74 87			74 87
Leather-working machinery						3														3	10 59			10 59
Textile and laundry machines						10														10	848 45	3,444 90		4,293 35
Baking-machines						1														1	96 53			96 53
Confectionery and sugar-refining machinery						6														6	141 25	10 02		151 27
Food-products machinery						7									2					9	141 30			141 30
Shipyard machinery (N.E.S.)							7													7	224 17	22 29		246 46
Power-driven machinery (N.E.S.)		8	3	9	4	15	3			3	1		1		5	1				53	2,617 34	1,829 41	3,562 20	8,008 95

Hoisting Apparatus and Conveyors.																									
Logging operations (hoisting and conveying apparatus)	94	....	1	....	....	....	1	....	....	....	..	....	....	....	....	..	....	..	..	96	$ 14,922 08	$ 7,039 43	$ 150 00	$ 22 111 51
Elevators (not construction)	1	....	....	....	1	12	.....	2	2	1	..	....	....	....	....	..	2	..	..	21	945 72	294 35	7,333 59	8,573 66
Construction elevators and hoists	.....	....	....	....	..	....	.....	....	....	....	..	....	....	1	....	..	....	..	..	1	36 30	.....	.....	36 30
Cranes and derricks	10	....	....	5	6	....	28	....	13	1	..	....	....	....	....	..	1	..	..	64	5,551 53	5,955 04	18,320 59	29,827 16
Blocks, tackles, capstans, winches, cables, etc. (N.E.S.)	53	4	16	9	2	2	26	....	16	10	..	1	1	....	5	..	....	1	..	146	10,472 68	6,573 12	7,260 67	24,306 47
Hoisting apparatus and conveyors	3	....	2	1	....	2	2	....	2	2	..	....	....	....	....	..	1	..	..	15	592 97	.....	.....	592 97
Miscellaneous Machinery.																									
Pumps	3	....	1	....	....	....	.....	....	....	1	..	....	....	....	....	..	....	..	..	5	225 49	101 78	.....	327 27
Pile-drivers	.....	....	....	....	....	....	1	....	....	....	..	....	....	....	1	.	....	..	..	2	59 18	.....	.....	59 18
Boilers and Steam-pressure Apparatus.																									
Steam-boilers (all accidents)	4	....	1	....	....	....	.....	....	....	....	..	....	....	....	....	..	....	..	..	5	144 03	.....	6,217 48	6,361 51
Steam-pipes or water-gauges	1	....	1	....	1	....	.....	....	....	....	..	1	....	....	....	..	....	..	..	4	72 24	.....	.....	72 24
Other steam-pressure apparatus	2	....	1	3	2	....	3	....	1	3	..	....	....	....	1	..	....	..	..	16	1,115 39	428 16	.....	1,543 55
Air-pressure apparatus	.....	....	....	1	....	....	1	....	....	1	2	....	....	....	....	..	....	..	.	5	319 55	.....	.....	319 55
Vehicles and Water Transportation.																									
Train wrecks, collisions, or derailments	2	....	....	....	....	....	.....	2	....	3	1	2	....	....	....	..	....	..	..	10	827 33	.....	5,714 66	6,541 99
Falls from trains or locomotives	3	....	....	....	....	....	2	2	....	26	1	6	1	....	....	1	....	1	..	43	5,794 14	.....	3,060 12	8,854 26
Struck by or run over by trains or locomotives	1	....	1	....	....	....	.....	....	....	2	1	....	1	....	....	..	....	..	..	6	950 00	704 07	19,695 69	21,349 76
Coupling railway cars	2	....	3	1	....	....	.....	1	....	10	3	....	1	....	....	..	....	1	.	22	3,411 48	2,163 11	.....	5,574 59
Other railway causes	1	1	....	....	1	....	1	2	....	21	4	6	2	....	....	..	....	..	..	39	2,771 17	4,870 77	6,261 83	13,903 77
Street-railway collisions or derailments	1	....	....	....	....	1	.....	3	....	....	..	....	....	....	....	..	1	..	..	6	283 50	.....	.....	283 50
Falls from street-cars	.....	....	....	....	....	....	.....	1	....	....	..	....	....	....	....	..	....	..	..	1	11 80	.....	.....	11 80
All other street-car causes	.....	....	....	....	....	....	.....	9	....	....	..	....	....	....	....	..	....	..	..	9	354 94	196 53	.....	551 47
Logging railways or locomotives	25	....	....	....	....	....	.....	....	....	....	..	....	....	....	....	..	....	..	..	25	2,860 90	1,715 79	8,251 65	12,828 34
Mine, quarry, other cars or locomotives	7	....	207	57	....	....	5	2	1	22	..	1	2	1	....	1	....	..	..	306	21,321 40	8,250 45	13,383 77	42,955 62
Hand-trucks, barrows, etc	46	10	3	3	2	6	14	1	13	12	3	....	....	....	....	..	....	..	..	113	3,199 65	495 97	3,872 05	7,567 67
Automobiles and motor-cycles (collisions)	1	....	....	....	....	2	.....	....	....	1	..	....	1	2	....	..	1	..	..	8	737 54	.....	.....	737 54
Automobiles and motor-cycles (skids and side-slips)	.....	....	....	....	....	....	1	....	....	....	..	....	....	1	....	..	....	..	..	2	30 24	.....	.....	30 24
Automobiles and motor-cycles (back-fire while cranking engine)	3	1	....	1	23	15	2	....	....	1	..	....	....	8	....	.	5	..	..	59	3,277 39	1,180 37	3,915 41	8,373 17
Automobiles and motor-cycles (all other accidents)	3	1	....	....	12	16	4	5	2	3	1	1	1	5	....	..	5	..	..	59	3,557 32	2,696 56	4,296 06	10,549 94
Animal-drawn vehicles	41	....	27	1	1	10	9	....	3	2	..	....	3	3	....	..	3	..	..	103	7,736 19	2,449 06	.....	10,185 25
All vehicles (N.E.S.)	1	....	....	....	....	1	3	....	....	1	..	....	....	1	1	..	....	..	..	8	212 70	.....	.....	212 70
Water transportation (accidents incidental thereto)	2	....	....	....	....	....	2	....	1	1	..	....	....	....	4	..	....	..	..	10	630 22	246 80	4,516 53	5,393 55
Explosives, Electricity, Fire, etc.																									
Explosives (manufacturing and storing)	.....	....	....	....	....	....	.....	....	....	....	..	....	....	....	....	..	....	..	..	.....	.....	.....	4,298 65	4,298 65
Explosives (blasting accidents)	5	....	4	6	....	....	5	3	....	2	..	....	4	....	....	..	....	..	..	29	3,443 71	5,188 18	.....	8,631 89
Explosives (other causes)	1	....	....	3	....	....	.....	1	....	....	..	....	....	....	....	..	....	..	..	5	463 24	771 44	4,788 79	6,023 47
Explosives (mines only)	....	....	1	2	....	....	.....	....	....	....	..	....	....	....	....	..	....	..	..	3	418 16	545 31	565 02	1,528 49
Explosions of molten metal	.....	....	..	5	....	1	2	....	....	....	..	....	....	....	....	..	....	..	..	8	799 96	.....	.....	799 96
Molten metals (other accidents)	3	....	....	15	10	1	3	....	....	8	..	....	....	....	....	..	....	..	..	40	5,178 78	270 00	.....	5,448 78
All other explosions (except steam)	3	....	....	2	4	3	4	1	4	4	..	....	1	1	1	..	....	..	..	28	2,030 13	1,830 21	75 00	3,935 34
Electricity	4	1	....	....	....	1	2	3	....	3	..	....	....	....	....	..	....	..	..	14	551 48	.....	4,254 56	4,806 04
Fires	3	....	....	1	6	2	6	....	....	3	..	1	1	3	2	..	....	..	..	28	1,299 36	.....	.....	1,299 36
Forest fires	1	....	....	....	....	....	.....	....	....	....	..	....	....	....	....	..	....	..	1	2	52 53	.....	.....	52 53
Fire and heat (N.E.S.)	8	....	3	2	4	3	19	1	1	2	..	1	....	1	....	..	....	..	..	45	1,354 53	.....	75 00	1,429 53
Scalding water (N.E.S.)	12	....	2	1	....	9	3	1	1	8	..	1	1	....	1	..	....	..	..	40	1,444 07	.....	.....	1,444 07
Hot asphalt, pitch, or tar	2	....	....	2	1	3	7	1	....	3	..	....	....	....	....	..	....	..	..	19	544 14	.....	5,354 64	5,898 78
Acids and caustics	1	....	3	2	....	1	3	1	....	4	..	....	....	....	....	4	....	..	..	21	1,221 89	948 43	2,778 95	4,949 27
Lime	....	....	....	1	....	....	.....	....	....	1	..	....	....	....	....	..	....	..	..	2	95 60	.....	.....	95 60

TABLE C.—STATEMENT SHOWING THE CAUSES OF ALL FINALLED ACCIDENTS DURING 1919—*Continued.*

Causes of Accidents.	CLASS NO. OF TEMPORARY TOTAL DISABILITY ACCIDENTS.																		T.T.D.		P.P.D.	Fatals.	Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	No. of Accidents.	Payments.			
Falls of Persons.																								
From scaffolds and stagings	16	1	3	5	1	....	61	1	....	3	..	....	1	1	....	..	....	..	..	93	$ 5,847 89	$ 630 00	$ 16,445 15	$ 22,923 04
Collapse of scaffold	5	....	....	7	1	...	16	....	1	....	..	1	....	....	....	..	....	..	..	31	3,934 26	1,377 55	3,589 86	8,901 67
Collapse of support	17	....	2	1	....	5	12	3	3	2	..	1	1	1	....	..	1	..	..	49	3,750 56	140 22	.....	3,890 78
From ladders	12	2	3	6	1	10	25	1	2	6	1	1	....	3	4	1	1	1	..	80	5,803 64	377 28	5,871 48	12,052 40
From machinery or trucks	37	4	6	7	1	12	6	3	4	17	1	4	2	1	1	..	5	2	..	113	7,076 26	984 86	3,233 19	11,294 31
From boats and vessels under construction	.....	.....	.....	.....	.....	.....	32	....	....	....	..	....	....	....	....	..	....	..	..	32	3,444 74	1,454 07	.....	4,898 81
From buildings under construction or demolition	4	1	1	4	1	1	13	....	....	1	..	....	....	....	....	1	....	..	..	27	3,971 08	1,556 23	2,055 87	7,583 18
All other falls from a height	70	4	7	14	4	14	37	4	9	13	1	....	3	2	4	2	2	1	1	192	16,697 68	6,134 43	25,905 26	48,737 37
Into excavations, pits, shafts	16	1	5	2	3	5	15	....	9	5	..	....	....	....	1	1	1	..	..	64	4,135 21	2,194 55	75 00	6,404 76
Falls, slipping or stumbling	233	9	48	58	12	27	169	12	35	60	3	10	6	20	16	2	7	4	..	731	37,864 46	607 44	75 00	38,546 90
Falling, Rolling, or Moving Objects.																								
Falling overhead coal or rock (in mine)	3	....	203	124	....	....	2	....	....	28	..	....	....	....	....	..	....	..	..	360	30,351 85	15,733 78	36,081 21	82,166 84
Falling overhead coal or rock (not in mine)	2	....	....	8	1	1	16	2	....	8	..	3	3	4	....	..	....	..	..	48	2,566 06	.....	4,876 19	7,442 25
Falling overhead material (not in mine)	2	....	....	....	....	1	20	1	....	1	..	....	....	....	....	..	....	..	..	25	1,502 68	728 57	.....	2,231 25
Falling timber, lumber, etc	257	9	27	20	2	4	189	4	27	12	2	7	2	5	5	1	1	1	..	575	31,705 81	5,654 30	24,870 65	62,230 76
Falling trees	123	....	3	....	....	....	2	1	....	4	..	....	5	1	....	1	....	..	..	140	20,974 30	4,783 65	24,014 00	49,771 95
Rolling or moving logs	231	1	3	2	1	....	12	....	2	6	1	1	..	1	2	1	1	..	..	265	27,729 89	9 820 80	21,305 28	58,855 97
Slide or cave-in	.....	....	....	2	....	....	3	2	....	4	1	2	4	1	....	.	....	..	..	19	2,930 19	932 18	1,757 43	5,619 80
Snowslide	.....	....	....	....	....	....	.....	....	....	.....	..	....	1	....	....	....	....	..	..	1	375 43	.....	5,395 58	5,771 01
Flying objects	81	5	24	34	15	7	75	2	4	16	2	4	4	1	....	1	2	..	..	277	12,757 03	32,700 45	150 00	45,607 48
Falling objects from trucks, etc	101	10	20	10	7	18	32	6	13	23	3	6	3	2	1	..	5	3	..	262	14,925 19	5,184 97	75 00	20,185 16
Falling, rolling, moving objects	55	9	9	51	31	27	137	7	62	46	2	10	5	7	8	1	8	5	1	481	25,728 84	3,188 61	4,464 17	33,381 62
Miscellaneous.																								
Handling lumber, timber, etc	96	5	16	9	1	4	57	1	4	9	..	2	2	4	1	..	....	..	..	211	7,637 36	232 29	.....	7,875 65
Handling heavy machinery or heavy objects	36	3	18	24	27	29	51	7	24	25	3	5	1	8	6	4	15	1	..	287	9,373 74	1,047 19	....	10,420 93
Handling wire cables, sheet metals, and similar substances	39	3	9	6	6	14	27	3	21	4	1	....	....	3	10	..	3	1	..	150	5,342 99	1,454 39	....	6,797 38
Lifting	40	5	30	14	14	14	46	4	7	20	..	2	3	6	1	2	5	1	..	214	9,317 22	1,194 35	.....	10,511 57
Caught on or struck nail or sharp projection	86	14	18	17	22	46	85	8	8	22	4	8	5	10	21	..	6	2	..	382	12,196 53	2,889 04	3,440 40	18,525 97
Doors shutting	3	1	3	6	2	6	4	....	3	2	..	....	....	1	....	..	1	..	..	32	1,648 52	315 54	.....	1,964 06
Cut by glass	3	1	....	1	...	19	4	....	....	2	..	....	....	....	1	..	1	..	..	32	861 25	.....	....	861 25
Cut by axe or adze, etc	269	....	15	15	1	1	53	3	...	17	2	3	25	6	4	1	..	1	1	417	17,560 44	2,558 76	....	20,119 20
Injured by pick or peavy	47	...	5	2	....	....	7	1	6	2	1	2	1	....	1	..	....	..	..	75	2,661 88	.....	.....	2,661 88
Hand-saws	76	....	6	1	1	1	8	....	....	2	..	....	4	....	1	..	....	..	..	100	3,138 11	156 61	....	3,294 72
Stepping on nail, etc	17	1	7	2	2	14	23	....	3	5	..	....	1	....	2	..	1	..	..	78	1,691 37	.....	....	1,691 37
Inhalation of poisonous gas	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	..	.....	.....	.....	.....	1	.....	..	..	2	255 27	.....	4,459 43	4,714 70
Anthrax	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	..	.....	.....	.....	.....	..	.....	..	..	1	16 50	.....	.....	16 50
Lead poisoning	.....	.....	.....	1	....	4	.....	....	...	47	..	.....	.....	.....	.....	..	.....	..	..	52	2,532 79	.....	....	2,532 79
Cedar poisoning	8	....	.....	.....	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	..	.....	..	..	8	312 12	.....	.....	312 12
Sulphur poisoning	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	..	.....	..	..	1	10 27	.....	.....	10 27
Poisons (N. E. S.)	4	....	.....	.....	.....	.....	.....	.....	.....	.....	..	.....	3	1	.....	..	.....	..	..	8	270 17	.....	.....	270 17
Hand-tools (N. E. S.)	74	11	17	25	19	55	102	5	14	25	3	7	6	6	9	2	2	2	1	385	12,845 02	2,742 67	4,072 79	19,660 48
Drowning	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	..	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	112,552 11	112,552 11
Accidents by animals, insects, reptiles, etc	40	...	31	2	2	15	5	....	....	2	..	....	6	4	....	..	12	..	..	119	7,796 36	712 80	4,681 17	13,190 33
Tools, etc., in the hands of fellow-workmen	34	2	8	5	2	2	37	2	4	13	1	6	1	3	...	1	1	..	..	122	4,621 58	1,031 21	.....	5,652 79
Accidents not elsewhere classified	1	..	....	2	..	2	2	2	....	....	..	....	....	....	....	..	....	..	..	9	272 95	222 28	.....	495 23
	3,051	258	840	686	326	534	1,738	129	329	647	48	108	119	131	132	32	101	28	5	9,242	$539,079 50	$230,303 08	$482,660 61	$1,252,043 19

TABLE D.—PARTS OF THE BODY INJURED AND CLASSIFICATION COVERING 9,242 TEMPORARY DISABILITY CASES.

No. of Accidents	Location of Injury. Part of Body.	Right.	Left.	Both.	Nature of Injury. Infection.	Bruise or Crush.	Cut or Laceration.	Puncture.	Sprain or Strain.	Fracture.	Dislocation	Amputation.	Scald or Burn.	Miscellaneous.	Class No. 1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	Amount.
33	Abdomen	....	....	..	....	24	2	....	6	....	..	....	....	1	13	....	6	1	....	....	8	1	....	4	..	....	....	....	....	..	....	..	..	$ 1,780 06
418	Ankle	211	199	8	5	77	23	4	271	26	8	....	9	....	127	4	52	35	3	24	70	4	20	44	4	5	4	11	1	1	6	3	..	26,294 97
484	Arm	256	222	6	27	126	112	17	39	136	10	3	33	8	168	13	43	18	23	44	88	6	14	24	3	4	7	14	6	2	6	1	..	41,815 94
432	Back	....	....	..	3	158	7	3	234	24	1	....	5	....	112	5	57	44	14	18	93	12	12	26	2	7	5	8	6	3	6	1	1	23,168 41
10	Brain	....	....	..	....	....	....	....	....	....	..	....	....	10	2	1	....	1	....	2	1	....	1	....	....	1	....	1	....	....	....	....	..	602 49
94	Chest	....	....	..	....	70	7	3	8	4	..	....	2	....	33	2	15	7	1	8	11	....	4	6	..	1	1	2	1	..	1	1	..	3,519 73
12	Ear	7	5	..	....	2	10	....	....	....	..	....	....	....	2	....	2	2	....	....	4	....	....	1	..	....	....	....	....	..	1	..	..	245 76
393	Eye	167	206	20	14	64	149	3	..	....	..	3	60	114	82	7	35	59	21	10	127	4	4	21	2	4	8	2	2	3	2	..	..	19,162 44
182	Face	....	....	..	6	18	109	1	....	....	..	....	54	....	54	....	17	13	5	5	36	3	7	23	1	2	6	3	3	2	1	..	1	9,153 50
1301	Fingers (1)	659	642	..	258	352	595	115	3	135	9	73	11	8	439	73	111	99	76	91	204	10	42	67	6	11	14	9	28	5	12	4	..	50,371 63
239	" (2)	109	129	1	7	64	138	2	....	11	2	19	1	2	94	23	16	13	11	15	29	2	7	14	3	1	....	1	3	1	5	1	..	10,469 36
81	" (3)	45	35	1	2	24	39	....	....	4	2	11	1	....	25	8	4	2	7	10	9	....	2	6	..	1	1	4	1	..	1	..	..	4,914 62
26	" (4)	14	11	1	....	5	13	....	..	....	..	2	6	....	6	1	1	1	5	7	2	....	1	....	....	....	....	....	1	..	1	..	..	1,601 17
3	" (5)	....	....	3	....	1	1	1	....	....	..	....	....	....	2	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	57 45
820	Foot	403	398	19	46	359	179	99	49	94	2	3	30	5	293	4	60	69	20	38	181	13	28	59	5	7	13	6	14	3	3	4	..	41,211 81
10	Groin	5	5	..	....	5	1	....	4	....	..	....	....	....	6	....	....	1	1	....	....	1	....	1	..	....	....	....	....	..	....	..	..	326 74
3	Heel	1	2	..	....	2	1	....	....	....	..	....	....	....	....	....	....	1	....	....	1	....	....	1	..	....	....	....	....	..	....	..	..	66 09
723	Hand	346	363	14	202	125	373	101	19	42	..	2	51	10	230	22	47	44	31	67	130	12	37	46	4	6	6	18	15	3	2	2	1	27,280 58
285	Head	....	....	..	1	54	192	1	....	22	..	....	5	10	82	2	36	22	7	17	52	9	12	25	..	7	4	3	2	..	4	1	..	19,738 14
120	Hip	55	56	9	1	84	6	2	17	7	3	....	1	....	35	....	13	12	...	4	27	1	3	11	..	3	1	2	2	..	5	1	..	9,111 16
22	Jaw	....	....	..	....	3	3	....	....	16	..	....	..	....	9	....	2	3	....	3	2	....	1	1	..	....	1	....	....	....	....	....	..	1,908 15
3	Heart	....	....	..	....	....	....	....	....	....	..	....	....	3	....	....	....	....	1	....	....	....	....	1	..	....	....	....	....	1	....	....	..	245 95
2	Kidney	....	....	..	....	1	....	....	....	....	1	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	..	417 73
426	Knee	212	207	7	20	192	82	15	121	4	10	....	2	....	155	7	36	26	12	13	83	6	18	29	4	4	6	11	7	..	7	2	..	23,741 87
710	Leg	323	368	19	40	262	192	15	25	201	..	3	11	1	298	10	66	37	12	23	133	11	34	31	3	8	14	12	7	1	6	2	2	96,044 67
3	Lip	....	....	..	....	....	3	....	....	....	..	....	....	....	2	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	..	90 68
2	Lungs	....	....	..	....	....	....	....	....	....	..	....	....	2	....	1	....	....	....	..	....	....	....	....	....	....	....	....	1	....	....	....	..	112 39
12	Neck	....	....	..	....	5	3	....	2	....	..	....	2	....	3	....	....	....	....	....	6	....	1	2	..	....	....	....	....	....	....	....	..	290 98
37	Nose	....	....	..	2	5	12	....	....	20	..	....	....	....	14	2	1	1	1	1	11	....	2	2	..	1	....	....	....	..	1	..	..	1,896 33
8	Pelvis	....	....	..	....	2	1	....	1	4	..	....	....	....	3	....	1	....	....	1	....	1	1	1	....	....	....	....	....	....	....	....	..	1,772 70
4	Perinæm	....	....	..	....	4	....	....	....	....	..	....	....	....	2	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	..	73 53
499	Ribs	....	....	..	....	113	....	3	37	343	2	....	....	1	189	9	41	34	7	17	97	7	17	43	4	4	7	4	9	4	6	..	..	24,909 13
6	Scrotum	....	....	..	....	1	5	....	....	....	..	....	....	....	5	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	..	..	195 06
236	Shoulder	112	114	10	..	94	5	....	67	37	30	....	3	....	83	6	33	13	2	17	41	3	7	12	..	5	4	3	....	..	6	1	..	17,340 97
18	Testicle	....	....	..	....	16	1	....	....	....	..	....	....	1	4	....	1	....	....	....	5	1	1	3	....	....	2	....	....	....	....	1	..	..	713 17
143	Thigh	70	58	15	5	97	23	4	6	7	2	....	4	....	51	1	17	10	6	8	25	2	7	5	2	2	4	....	2	....	1	..	..	9,509 07
402	Thumb	189	212	1	73	102	205	43	8	27	3	12	2	....	129	33	36	33	15	36	60	8	5	18	..	7	4	3	7	2	5	1	..	15,692 44
23	" and finger	8	15	..	1	1	19	....	....	1	..	2	....	....	13	2	....	1	1	2	3	..	....	....	....	....	....	....	1	..	....	....	..	1,164 93
5	" " 2nd "	2	3	..	....	2	3	....	....	....	..	....	....	....	2	1	....	....	....	....	1	....	....	....	....	....	....	....	1	....	....	....	..	194 34
3	" " 3rd "	1	2	..	....	....	3	....	....	....	..	....	....	....	....	1	....	....	....	2	....	....	....	....	....	....	....	....	....	....	....	....	..	141 28
4	" " 4th "	1	3	..	1	1	3	....	....	....	..	....	....	....	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	276 42
544	Toes	277	265	2	13	295	90	9	6	133	1	9	1	....	164	15	50	50	23	13	129	9	25	37	2	7	4	6	3	..	6	1	..	20,635 36
276	Wrist	155	116	5	19	19	69	19	114	38	7	....	10	....	78	4	29	20	18	24	43	3	10	18	1	6	2	4	7	1	7	1	..	13,708 85
4	Cedar poison	....	....	..	....	....	....	....	....	....	..	....	....	4	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	250 24
4	Gassed	....	....	..	....	....	....	....	....	....	..	....	....	4	1	....	....	....	....	....	1	....	....	1	..	....	....	....	1	....	....	....	..	516 34
33	Hernia	....	....	..	....	....	....	....	....	....	..	....	....	33	6	....	4	3	2	1	6	....	3	5	..	2	....	1	....	....	....	....	..	3,790 71
57	Leaded	....	....	..	....	....	....	....	....	....	..	....	....	57	....	....	....	1	....	5	....	....	....	51	....	....	....	....	....	....	....	....	..	2,728 01
83	Multiple	....	....	..	....	55	9	....	1	5	..	....	5	8	24	....	7	9	....	5	18	....	3	8	2	2	3	....	2	....	....	....	..	9,656 86
1	Nearly drowned	....	....	..	....	....	....	....	....	....	..	....	....	1	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	68 75
2	Shock	....	....	..	....	....	....	....	....	....	..	....	....	2	1	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	..	28 50
1	Occupational disease	....	....	..	....	....	....	....	....	....	..	....	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	..	71 50
9242		....	....	..	746	2884	2688	460	1038	1342	93	142	309	286	3051	258	840	686	326	534	1738	129	329	647	48	108	119	131	132	32	101	28	5	$ 539,079 50

TABLE E.—TABLE COVERING 484 PERMANENT PARTIAL DISABILITY ACCIDENTS, SHOWING NATURE OF INJURY, CLASS, AND COST, 1919.

No. of Accidents.	Particulars of Injury.	Class. No.																	Cash Payment and Reserve.	Average Cost per Accident.
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	
4	Ankle impaired	2	....	1	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	$ 2,523 20	$ 630 80
5	Arm amputated	4	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	12,383 00	2,476 60
17	Arm impaired	9	....	1	....	....	....	3	....	....	2	....	....	1	....	....	1	....	....	17,402 14	1,023 65
3	Ear (deaf in one ear)	1	....	....	....	....	....	1	....	....	....	....	1	....	....	....	....	....	....	1,574 47	524 82
1	Ear (impaired)	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	279 53	279 53
1	Eyes (total blindness)	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	7,927 48	7,927 48
23	Eye (loss of sight in one eye)	11	1	1	3	....	....	4	....	....	2	....	....	1	....	....	....	....	....	21,701 45	943 54
30	Eye impaired	5	1	3	6	1	2	7	1	....	2	....	1	....	....	1	....	....	..	15,173 95	505 79
162	Fingers (loss of one)	70	9	10	11	8	10	27	....	2	8	1	1	1	2	1	....	....	1	12,253 78	75 64
45	Fingers (loss of two)	21	4	2	3	1	2	4	....	1	4	....	1	....	1	1	....	....	....	9,002 33	200 05
16	Fingers (loss of three)	5	5	1	....	2	2	1	....	....	....	....	....	....	....	....	....	....	....	6,191 94	386 99
7	Fingers (loss of four)	5	1	....	....	....	..	....	....	1	....	....	....	....	....	....	....	....	....	5,370 57	767 22
6	Hand amputated	3	1	1	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	11,347 66	1,891 27
22	Hand impaired	12	....	2	....	....	3	1	1	....	2	....	....	1	....	....	....	....	....	20,789 71	944 98
3	Facial disfigurement	2	....	....	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	950 00	316 66
1	Foot amputated	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	1,262 16	1,262 16
11	Foot impaired	3	....	....	....	1	....	4	....	1	....	....	1	....	....	1	....	....	....	5,429 91	493 62
8	Knee impaired	1	....	1	....	....	....	4	....	1	1	....	....	....	....	....	....	....	....	5,968 04	746 08
3	Leg amputated	1	....	....	1	....	....	....	....	....	1	....	....	....	....	....	....	....	....	6,545 96	2,181 98
38	Leg impaired	23	....	....	2	....	1	4	3	1	1	....	1	....	1	1	....	....	....	23,480 38	617 90
7	Spinal injury	2	....	3	2	....	....	....	....	....	....	....	....	....	....	....	....	....	....	19,268 82	2,752 68
33	Thumb amputated	12	3	1	3	1	3	3	1	1	3	....	....	....	....	1	....	1	....	7,313 28	221 61
8	Thumb and first finger amputated	6	..	....	....	....	1	....	....	....	....	....	....	....	....	1	....	....	..	2,720 43	340 05
5	Thumb and second finger amputated	4	....	....	....	....	1	....	....	....	....	....	....	....	....	....	....	....	....	3,255 80	651 16
11	Toes (loss of one)	5	....	....	....	....	..	5	....	....	....	....	1	....	....	....	....	....	....	1,295 17	117 74
7	Toes (loss of two or more)	5	....	....	....	....	....	....	....	....	2	....	....	....	....	....	....	....	....	1,122 90	160 41
10	Miscellaneous	4	....	1	....	....	....	2	1	1	....	....	....	....	1	....	....	....	....	7,768 42	776 84
487		217	25	28	32	14	26	72	8	9	29	1	7	4	5	7	1	1	1	$ 230,303 08	.....

TABLE F.—AGE CHART, SHOWING WORKMAN'S AGE AND CLASSIFICATION IN 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS.

Years.	CLASS NUMBER.																		Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
13	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	2	.....	.....	5
14	5	4	1	.....	1	9	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	24
15	15	13	7	2	3	22	9	.....	1	1	.....	.....	1	.....	.....	.....	1	.....	.....	75
16	35	17	21	2	22	25	17	.....	2	4	.....	1	1	.....	2	.....	2	.....	.....	151
17	39	21	20	3	29	22	15	.....	4	11	.....	1	2	.....	.....	.....	3	.....	.....	170
18	52	9	21	8	21	23	43	1	3	21	.....	3	3	1	5	1	3	.....	.....	218
19	60	8	20	12	21	16	45	2	6	14	1	5	.....	1	5	.....	2	.....	.....	218
20	67	6	10	7	11	8	29	1	1	10	1	1	1	1	1	.....	2	.....	.....	157
21	53	5	9	5	7	10	24	2	5	16	3	4	1	1	2	.....	3	.....	.....	150
22	47	8	11	10	6	10	28	.....	1	10	.....	6	5	3	1	2	.....	1	.....	149
23	67	7	13	12	6	12	34	1	3	10	.....	.....	2	2	3	.....	1	1	.....	174
24	58	6	24	11	6	9	27	4	3	10	2	1	4	2	6	.....	2	1	.....	176
25	77	8	20	11	6	7	34	3	4	14	.....	.....	2	3	2	2	3	.....	.....	196
26	88	2	24	25	8	9	33	4	6	19	3	.....	1	4	3	1	4	.....	.....	234
27	80	4	20	18	3	9	37	3	8	12	2	1	5	2	.....	1	3	.....	.....	208
28	99	3	21	20	9	16	36	4	9	20	1	3	6	3	3	2	2	.....	.....	257
29	89	4	22	22	11	10	49	2	11	24	4	4	1	2	4	.....	5	1	.....	265
30	125	10	23	31	8	13	40	4	13	24	2	4	4	2	2	1	3	1	.....	310
31	104	3	30	17	6	7	47	5	8	18	1	2	1	4	2	1	1	1	1	259
32	107	7	23	25	5	10	55	8	8	19	1	2	3	6	3	1	4	1	.....	288
33	69	5	29	20	8	11	39	1	8	9	.....	8	1	2	4	.....	6	1	.....	221
34	78	4	27	38	11	22	39	7	7	20	1	2	4	4	3	1	4	.....	.....	272
35	111	8	20	25	6	16	63	5	10	26	2	2	5	1	4	1	2	2	.....	309
36	95	7	22	27	11	11	58	5	12	20	1	2	3	3	5	1	1	.....	.....	284
37	99	5	23	26	7	15	55	3	14	24	3	3	7	2	3	1	3	1	.....	294
38	126	2	39	27	3	24	74	3	19	13	2	4	7	5	4	1	3	1	.....	357
39	98	6	29	24	8	13	46	6	10	20	1	6	1	6	8	1	3	.....	.....	286
40	125	9	28	29	11	13	69	7	18	25	2	6	2	5	4	.....	2	.....	1	356
41	72	6	21	17	5	13	41	2	11	15	1	2	.....	.....	7	1	1	.....	.....	215
42	87	6	28	25	8	9	58	2	11	19	1	2	.....	2	4	.....	4	1	.....	267
43	71	5	10	14	3	13	37	3	10	19	1	3	2	.....	2	2	4	1	1	204
44	49	3	15	12	7	12	36	6	10	13	.....	4	2	1	.....	1	.....	.....	.....	171
45	101	4	30	17	2	14	38	1	9	18	2	3	3	5	3	1	1	1	.....	253
46	58	3	22	20	4	8	45	3	8	11	1	2	2	7	1	1	1	2	.....	199
47	37	2	19	11	4	2	42	3	5	9	2	4	1	1	2	.....	1	.....	.....	145
48	59	4	12	14	7	19	35	5	10	13	1	1	2	4	4	1	2	1	.....	194
49	44	2	18	15	5	5	32	3	3	10	1	.....	3	1	3	.....	2	1	.....	148
50	70	4	18	17	1	12	39	3	9	12	1	3	4	1	2	1	1	1	.....	199
51	29	2	13	8	4	5	15	3	5	10	.....	.....	.....	1	2	.....	2	1	.....	100
52	45	2	9	6	3	10	30	3	6	9	1	1	4	3	5	1	3	.....	.....	141
53	26	3	6	5	2	3	34	1	2	8	.....	.....	.....	6	2	1	1	.....	.....	100
54	25	2	8	6	2	3	26	.....	6	5	1	2	4	4	2	.....	5	1	1	103
55	26	1	7	4	1	7	33	4	6	11	.....	.....	4	2	3	.....	.....	.....	.....	109
56	13	.....	4	5	4	4	23	.....	3	6	.....	2	.....	1	1	.....	1	.....	.....	67
57	17	3	6	5	.....	1	13	.....	2	9	1	.....	1	7	1	.....	.....	1	.....	67
58	19	4	9	5	1	1	21	.....	2	3	.....	2	4	3	2	2	.....	1	1	80
59	11	2	2	.....	.....	3	9	2	2	6	.....	2	.....	1	3	.....	1	.....	.....	44
60	35	1	5	3	1	4	16	1	4	9	.....	2	2	3	1	2	.....	.....	.....	89
61	12	2	1	2	1	2	6	.....	1	6	.....	1	.....	1	.....	.....	.....	.....	.....	35
62	15	.....	6	3	1	3	10	1	2	.....	.....	1	2	2	.....	.....	.....	.....	.....	46
63	9	.....	2	2	1	.....	14	.....	1	3	.....	.....	.....	1	1	.....	.....	.....	.....	34
64	12	.....	3	.....	1	5	7	.....	2	2	1	.....	.....	3	.....	.....	1	.....	.....	37
65	6	2	3	6	1	2	6	1	....	4	.....	.....	2	.....	.....	.....	.....	.....	.....	33

TABLE F.—AGE CHART, SHOWING WORKMAN'S AGE AND CLASSIFICATION IN 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS—*Continued.*

Years.	CLASS NUMBER.																		Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
66	5	.....	1	1	2	1	4	.....	1	2	.....	.....	1	1	.....	.....	.....	1	.....	20
67	7	.....	.....	2	.....	.....	2	1	.....	.....	.....	.....	1	1	.....	.....	.....	.....	.....	14
68	4	.....	3	.....	.....	1	4	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	14
69	1	.....	.....	2	.....	.....	4	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
70	2	2	1	1	.....	.....	4	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	11
71	1	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	4
72	3	1	.....	.....	.....	.....	1	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	7
73	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	2
74	.....	1	.....	1	.....	.....	1	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	4
75	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	2
76	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
77	.....	.....	.....	.....	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	2
78	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1
79	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	1
Unknown	7	.....	.....	.....	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	9
	3,051	258	840	686	326	534	1,738	129	329	647	48	108	119	131	132	32	101	28	5	9,242

TABLE II.—DURATION OF DISABILITY AND CLASSIFICATION COVERING 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS, 1919.

Days.	CLASS NUMBER.																		Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
3½-4	23	1	5	28	5	6	13	2	8	18	.....	1	3	1	.....	.....	.....	1	.....	115
5	74	6	22	33	16	21	63	4	11	31	3	4	4	8	6	3	1	2	.....	312
6	131	11	39	39	23	31	102	3	10	36	3	6	5	8	7	3	3	2	.....	462
7	181	10	42	37	22	42	119	8	6	44	1	9	5	11	9	2	8	1	.....	557
8	109	6	26	40	11	19	74	7	15	43	2	4	3	5	7	1	10	.....	.....	382
9	124	14	39	27	18	35	107	5	12	35	1	8	3	4	3	1	4	3	.....	443
10	129	10	28	33	14	34	100	7	8	22	4	4	8	7	10	1	4	.....	.....	423
11	131	10	39	30	11	24	59	5	9	26	5	3	3	2	5	1	2	3	2	370
12	127	16	32	29	14	25	85	3	21	23	....	.....	8	5	5	1	6	1	.....	401
13	116	15	35	25	11	20	70	6	7	26	2	1	2	5	5	2	4	.....	.....	352
14	109	7	35	26	9	22	76	7	10	21	.....	7	4	4	6	.....	3	1	.....	347
15	84	10	24	20	8	14	42	7	11	9	.....	2	3	1	5	.....	4	.....	.....	244
16	101	6	19	15	3	15	44	3	11	15	1	4	4	3	4	.....	3	1	.....	252
17	86	8	21	11	9	13	39	7	5	11	1	1	4	5	4	2	2	1	.....	230
18	75	5	24	20	10	10	45	3	9	14	1	3	2	3	1	.....	4	.....	.....	229
19	57	4	26	13	8	12	37	1	9	20	.....	4	1	2	6	.....	2	.....	.....	202
20	78	5	19	16	4	12	42	1	16	13	1	1	2	2	3	.....	.....	1	.....	216
21	64	3	23	7	8	6	41	4	5	15	1	3	3	3	.....	1	5	.....	1	193
22	47	4	17	10	4	5	25	1	2	10	.....	1	4	2	1	1	3	1	.....	138
23	56	8	13	5	7	8	28	2	8	7	1	.....	.....	1	2	2	2	.....	.....	150
24	61	7	12	11	7	15	29	1	6	6	1	1	3	.....	1	1	1	.....	.....	163
25	53	7	13	14	9	6	26	2	7	6	.....	2	2	5	2	.....	4	.....	.....	158
26	39	2	6	7	5	7	27	.....	3	7	2	.....	2	2	2	.....	1	.....	.....	112
27	52	7	14	13	3	7	25	3	3	9	1	.....	2	.....	.....	.....	3	1	.....	143
28	48	5	9	10	6	4	26	1	6	12	1	3	.....	2	2	.....	1	1	.....	137
29	42	1	15	9	4	4	10	1	3	10	1	2	5	1	2	.....	1	.....	.....	111
30	34	6	15	9	5	8	18	2	1	2	2	3	3	2	4	.....	1	.....	1	116
31	37	2	11	5	3	4	15	1	5	9	1	1	2	3	1	.....	.....	.....	.....	100
32	25	6	11	6	5	2	19	.....	7	4	.....	2	1	.....	2	.....	1	1	.....	92
33	31	4	5	2	5	2	19	1	4	7	1	1	1	1	1	.....	2	.....	.....	87
34	28	2	7	8	4	3	16	.....	3	6	.....	.....	3	2	2	1	.....	1	.....	86
35	25	4	7	7	2	6	13	1	2	3	1	.....	1	1	1	.....	1	.....	.....	75
36	17	.....	11	9	.....	3	4	.....	4	4	.....	.....	1	.....	.....	.....	1	.....	.....	54
37	26	.....	3	6	2	3	10	.....	3	1	.....	.....	1	1	.....	.....	1	.....	.....	57
38	25	4	10	5	3	6	10	1	3	3	.....	1	1	1	2	1	1	.....	.....	77
39	23	3	6	4	2	.....	11	1	3	7	.....	.....	.....	1	4	.....	.....	.....	.....	65
40	18	4	7	3	1	2	10	2	2	1	.....	.....	.....	.....	2	.....	.....	1	.....	53
41	21	3	10	4	2	8	7	.....	2	1	.....	2	.....	2	1	1	1	.....	.....	65
42	15	.....	4	4	2	2	16	.....	2	3	.....	1	.....	1	.....	.....	3	.....	.....	53
43	23	1	3	2	2	2	4	.....	2	4	.....	1	2	1	1	.....	.....	1	.....	49
44	19	3	6	1	1	1	3	1	2	5	.....	1	.....	.....	1	.....	.....	.....	.....	44
45	23	2	6	2	.....	2	8	1	2	5	.....	.....	.....	1	1	.....	1	.....	.....	54
46	14	1	3	3	1	2	7	1	2	4	.....	1	2	.....	1	.....	1	.....	.....	43
47	13	1	8	1	1	.....	5	.....	3	5	.....	.....	.....	1	.....	.....	.....	.....	.....	38
48	11	.....	3	3	.....	2	3	.....	.....	.....	.....	6	.....	.....	.....	.....	.....	.....	.....	28
49	16	1	2	2	3	.....	7	.....	1	4	.....	.....	1	.....	.....	1	.....	.....	.....	38
50	10	2	2	1	1	1	3	1	2	1	.....	1	.....	.....	.....	.....	.....	.....	.....	25
51	12	1	2	2	1	1	7	.....	2	2	.....	.....	1	1	1	.....	.....	.....	.....	33
52	4	.....	2	3	1	1	8	2	1	2	.....	1	1	.....	.....	.....	.....	.....	.....	26
53	10	1	5	2	2	4	5	1	2	1	.....	1	.....	.....	1	.....	.....	.....	.....	35
54	9	2	.....	1	3	2	7	1	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	28
55	4	.....	.....	5	1	1	.....	.....	3	1	.....	1	1	.....	.....	.....	1	.....	.....	18
56	4	2	2	3	1	3	3	.....	2	2	.....	1	.....	.....	1	.....	.....	1	.....	25

TABLE H.—DURATION OF DISABILITY AND CLASSIFICATION COVERING 9,242 TEMPORARY TOTAL DISABILITY ACCIDENTS, 1919—*Continued.*

Days.	Class Number.																		Total.
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	
57	6	.....	1	2	1	2	3	2	.....	3	.....	1	.....	1	.....	.....	1	.....	.....	23
58	11	.....	3	.....	.....	4	7	.....	4	5	.....	.....	.....	.....	.....	.....	.....	.....	.....	34
59	6	.....	2	1	.....	1	6	.....	2	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	19
60	10	1	1	1	.....	.....	5	1	2	4	.....	.....	.....	1	.....	.....	.....	.....	.....	26
61	12	.....	4	1	.....	.....	3	.....	2	2	1	.....	.....	.....	.....	.....	1	.....	.....	26
62	10	1	.....	.....	4	2	9	1	2	4	.....	.....	.....	.....	1	1	.....	.....	.....	35
63	7	1	1	2	1	2	1	.....	1	3	1	.....	.....	.....	.....	1	.....	.....	.....	21
64	7	.....	1	1	1	1	5	1	.....	.....	.....	.....	.....	1	1	.....	.....	.....	.....	19
65	6	.....	1	1	.....	.....	2	.....	.....	1	.....	.....	.....	2	.....	.....	.....	1	.....	14
66	4	.....	2	3	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	11
67	10	1	2	1	1	.....	6	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	23
68	6	2	3	.....	.....	.....	4	.....	1	.....	.....	.....	.....	1	.....	.....	.....	.....	.....	17
69	5	1	1	.....	.....	1	1	.....	.....	2	.....	.....	.....	.....	.....	.....	.....	.....	.....	11
70	3	1	3	1	1	.....	3	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	12
71-80	39	.....	10	9	3	8	14	.....	1	7	2	.....	1	3	.....	1	.....	.....	.....	98
81-90	25	1	12	5	3	3	15	.....	9	5	1	1	2	4	1	2	2	1	.....	92
91-100	16	2	5	4	3	3	11	2	3	5	1	2	1	1	.....	.....	.....	1	.....	60
100-150	76	1	18	9	4	10	25	1	8	13	2	3	3	1	2	.....	1	.....	1	178
151-200	37	3	9	3	1	3	11	1	5	8	.....	.....	2	3	.....	.....	.....	.....	.....	86
200-300	34	.....	5	3	.....	4	7	2	1	4	1	1	1	2	2	1	.....	.....	.....	68
300-400	13	.....	3	5	.....	1	6	2	.....	2	.....	.....	2	.....	.....	.....	.....	.....	.....	34
400-500	9	.....	1	1	.....	.....	.....	2	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	15
500-600	2	.....	3	1	.....	.....	1	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8
600-800	3	.....	1	1	.....	.....	.....	1	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	6
	3,051	258	840	686	326	534	1,738	129	329	647	48	108	119	131	132	32	101	28	5	9,242

CHART No 1
WORKMENS' COMPENSATION BOARD OF BRITISH COLUMBIA.
CHART SHEWING INDUSTRIES RESPONSIBLE FOR
9242
TEMPORARY DISABILITY ACCIDENTS
1919.
LOGGING
SHIPBUILDING
SAWMILLS
COAL MINING
RAILWAYS
QUARRYING AND METAL MINING
GENERAL MANUFACTURE
NAVIGATION AND STEVEDORES
WOODWORKING
SHINGLE MFG.
BUILDING AND CONSTRUCTION
SMELTING
PULP AND PAPER MFG.
METAL WORKING
MACHINE SHOPS AND FOUNDRIES
CANNING AND PACKING
MUNICIPALITIES
TEAMING
PROVINCIAL GOVT.
WHOLESALERS
EXPLOSIVES
FISHING
LAUNDRIES.
RETAILERS, JANITORS ETC
POWER, LIGHT AND GAS.
TELEGRAPH AND TELEPHONE.
DOMINION GOVT.
MISC.

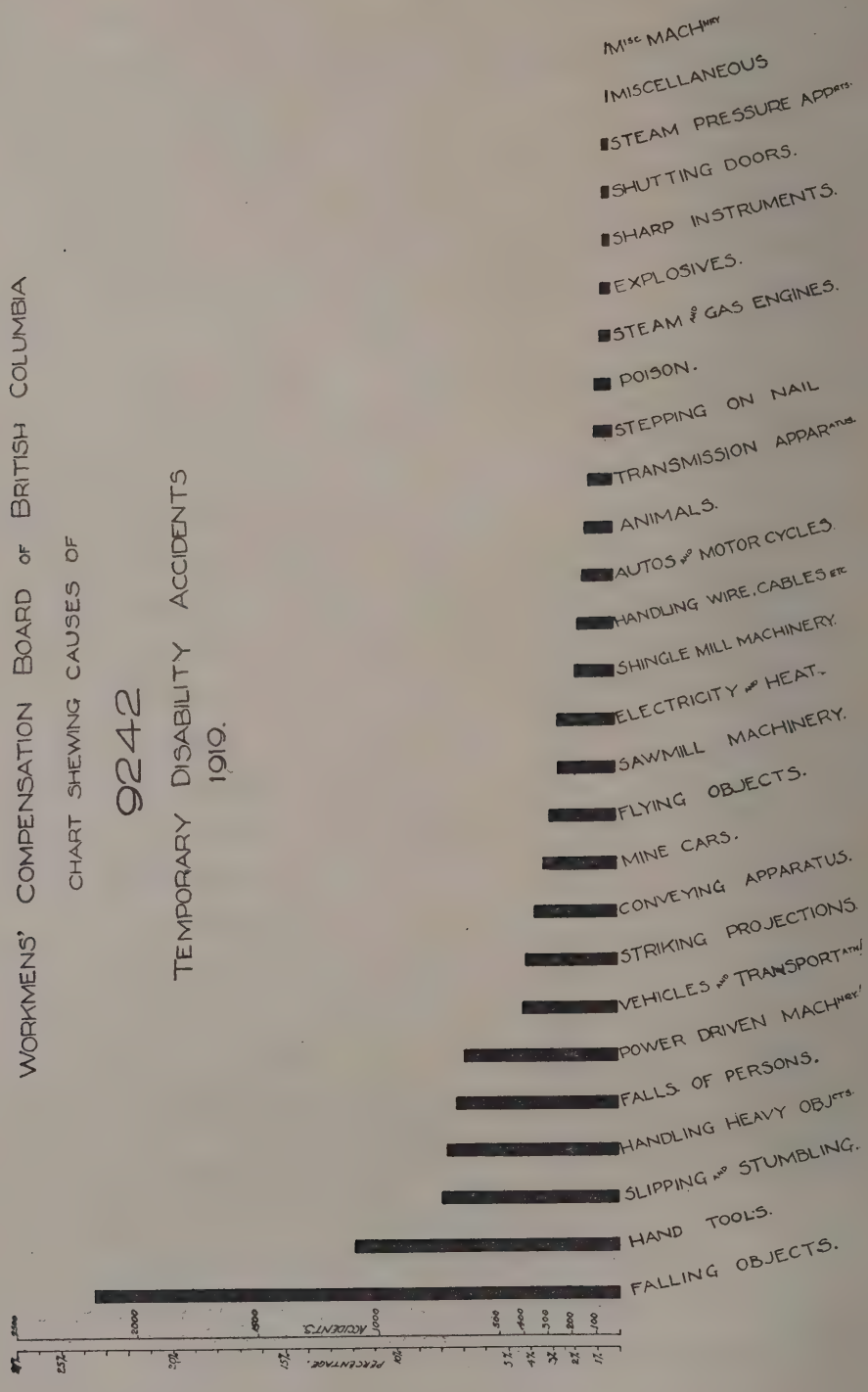
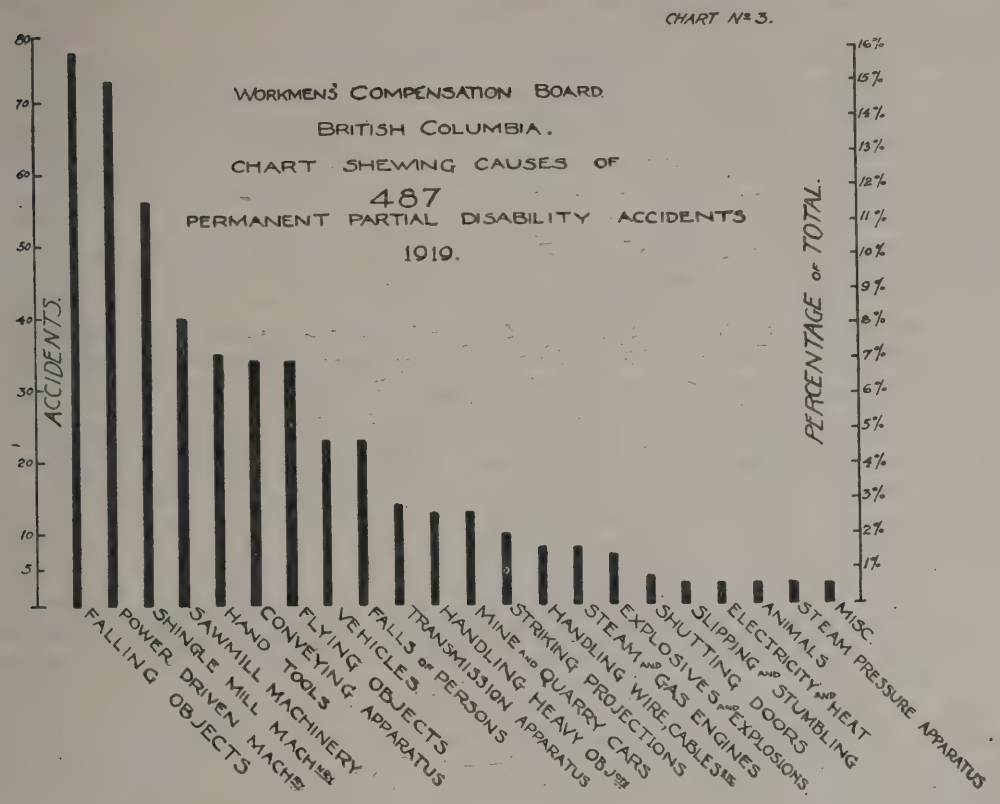


CHART No 2
WORKMENS' COMPENSATION BOARD OF BRITISH COLUMBIA
CHART SHEWING CAUSES OF
9242
TEMPORARY DISABILITY ACCIDENTS
1919.
FALLING OBJECTS.
HAND TOOLS.
SLIPPING AND STUMBLING.
HANDLING HEAVY OBJCTS.
FALLS OF PERSONS.
POWER DRIVEN MACHINERY
VEHICLES AND TRANSPORTATION
STRIKING PROJECTIONS.
CONVEYING APPARATUS.
MINE CARS.
FLYING OBJECTS.
SAWMILL MACHINERY.
ELECTRICITY AND HEAT.
SHINGLE MILL MACHINERY.
HANDLING WIRE, CABLES ETC
AUTOS AND MOTOR CYCLES.
ANIMALS.
TRANSMISSION APPARATUS.
STEPPING ON NAIL
POISON.
STEAM AND GAS ENGINES.
EXPLOSIVES.
SHARP INSTRUMENTS.
SHUTTING DOORS.
STEAM PRESSURE APPTS.
MISCELLANEOUS
MISC MACHINERY
ACCIDENTS.
PERCENTAGE.



CONCLUSION.

Re the Association of Workmen's Compensation Boards of Canada.

At Vancouver on December 2nd, 1919, representatives of the Workmen's Compensation Boards of New Brunswick, Ontario, Manitoba, Alberta, and British Columbia met and organized "The Association of the Workmen's Compensation Boards of Canada." The following are a number of the specific matters outlined in the constitution to which the activities of the organization are directed:—

(*a.*) To secure the unification of compensation laws and regulations thereunder:
(*b.*) To consider ways and means of preventing accidents:
(*c.*) To consider practices of administering compensation laws:
(*d.*) To consider means for the re-education and rehabilitation of injured workmen:
(*e.*) To consider the reporting and tabulation of industrial accidents and diseases.

The getting together of the Canadian Boards yearly for the above purposes as well as consideration of administrative difficulties cannot help but be beneficial.

Health Insurance.

Throughout the year frequent requests were made by both workmen and employers that claims be allowed for sickness disabilities that were alleged to have arisen out of industries. It is difficult to explain and convince the parties affected that the present Act is confined to accidents and industrial diseases, and that there is no discretion in the Board to pay compensation for other than these.

The inroads made on public health by the war and the "flu" epidemic are quite alarming. A study of the statistics covering the "Military Service Act" will convince one that nearly one-half of the young men of the Province have been in the casualty list or the lower physical categories. In 1918-19 no less than 2,734 people died in this Province from influenza and

pneumonia following influenza. The health of thousands of others was undermined, leaving the victims more than ever susceptible to disease.

At no time in the history of this country has its man-power been at a lower ebb, and this was brought about largely by a combination of nation-wide misfortunes for which the individual was not responsible, nor could he have escaped the results to any material extent by any effort of his own. Therefore the physical condition of the people is now more than ever before a matter for serious consideration by the State, and on the completeness with which the State solves the problem of a steady man-power depends much of the future happiness and prosperity of this country.

It is therefore believed that health insurance, and health insurance alone, whereby unlimited medical aid is supplied to those unable financially to obtain complete medical aid, is the sole solution.

As workmen's compensation has very materially assisted in bringing capital and labour together, so it is believed that health insurance will bring these bodies closer together and thereby very materially assist toward allaying the present unrest.

LIABILITY OF EMPLOYERS NOT WITHIN THE SCOPE OF PART I.

Employers not covered by Part I. of the Act are in a much worse position than under the old legislation, inasmuch as the three chief defenses—(*a*) Assumption of risk; (*b*) fault of a fellow-servant; and (*c*) contributory negligence—are now removed. On the other hand, the workmen by such removal are in a much better position.

FARMERS AND DOMESTIC SERVANTS.

Under section 74 of the Act farm-labourers and domestic servants and their employers are excluded from the benefits. The Board has no discretion whatever to extend the benefits to either of these particular bodies of employees.

The Board again wishes to bear testimony of the excellent, hearty, and efficient services rendered by the various members of the staff. To their courtesy in dealing with the public, and their care and attention to detail of the work passing through their hands depends, to a great extent, the successful working out of the Act.

Respectfully submitted.

PARKER WILLIAMS.
HUGH B. GILMOUR.
E. S. H. WINN, *Chairman.*

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

THE

UNIVERSITY OF BRITISH COLUMBIA

VANCOUVER, B.C.

BALANCE-SHEET AND STATEMENT

OF

RECEIPTS AND DISBURSEMENTS

AS AT

MARCH 31ST, 1920

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg herewith respectfully to present the Financial Statement of the University of British Columbia for the year ending March 31st, 1920.

J. D. MACLEAN,

Minister of Education.

May 7th, 1920.

VANCOUVER, B.C., April 30th, 1920.

The Hon. J. D. MacLean, M.D., C.M.,
Minister of Education, Victoria, B.C.

SIR,—At the regular meeting of the Board of Governors held on the 26th instant the annual statement for the year ending March 31st, 1920, was presented, and it was ordered that copies be sent to you, together with the explanatory letter prepared by the Bursar.

Yours very truly,

L. S. KLINCK,
President.

UNIVERSITY OF BRITISH COLUMBIA.

BALANCE-SHEET AND STATEMENT OF RECEIPTS AND DISBURSEMENTS.

VANCOUVER, B.C., April 26th, 1920.

The Chancellor and Board of Governors,
The University of British Columbia,
Vancouver, B.C.

DEAR SIRS,—I beg to submit the following annual statements for your approval:—

Balance-sheet as at March 31st, 1920, and statement of receipts and disbursements for the year ending March 31st, 1920.

UNIVERSITY SITE.

During the year the sum of $9,691.86 was expended on surveying and architect's fees, land-clearing, etc., at Point Grey. A reserve from the 1919-20 appropriations, amounting to $33,700, was made for land-clearing and building a permanent road. This work is now proceeding.

BUILDINGS.

During the same period $15,499.70 was expended on buildings at Point Grey, which includes such items as poultry colony houses and fencing, heaters in dairy-barn, and balance of contract for same, certified extras and plumbing in hay-barn and feed-store, bunk-house, and equipment for land-clearing, etc. The above sum also includes the unexpended balance on the Science Building, amounting to $8,948.90. This sum was distributed *pro rata* among the R. McLean Co. creditors and closes out the unexpended amount held in trust for work on the Science Building at Point Grey. Authority for this distribution was received from the Provincial Government. At the Hospital site, Fairview, $4,299.75 was expended on the temporary buildings, etc.—namely, additions to Library and Chemistry Buildings, lockers and fittings in the Chemistry and Geology Buildings.

A reserve from the 1919-20 appropriations, amounting to $19,675, was made for sundry buildings at Point Grey. This is shown under "Liabilities."

PROVINCIAL GOVERNMENT GRANTS.

The Provincial Government grant for the year ending March 31st, 1920, was $285,000, with a supplemental grant of $103,000, making a total of $388,000 for the year.

Under the Dominion "Agricultural Instruction Act" the University received only $4,000 of the $8,000 allotted to it through the Provincial Government, while the University has expended the sum of $1,448.04 in excess of the $4,000 received. This overexpenditure is shown under "Accounts receivable." In connection with this grant I have on several occasions taken the matter up with the President, and he assured me that the Provincial Government had stated several times that this grant would be paid. Under these circumstances I felt justified in making the advance, as otherwise the work would have to cease and the men engaged in it paid off.

The Honorary Advisory Council for Scientific and Industrial Research made a grant of $1,000 to the University for work on the grading of cream and butter in relation to the bacterial content of the cream and milk used in the preparation of these products. Of this amount, $883.33 has been expended at March 31st, 1920.

CO-OPERATIVE SEED-GROWING.

The amount received from the Dominion Government on this account was only $4.41, being balance of accounts rendered. This closed the Co-operative Seed Account.

SCHOLARSHIPS AND PRIZES.

The Terminal City Club, Vancouver, B.C., presented the University with two Victory War Loan bonds for $1,000 each, bearing interest at 5½ per cent. per annum and maturing on November 1st, 1933, and November 1st, 1934, as an endowment for the Terminal City Club

Scholarship. Other cash scholarships and prizes presented to the University during the year will be found in detail under "Receipts," subheading "Students' scholarhsips, prizes, and loans."

DEPRECIATION.

Ten per cent. depreciation, amounting to $110,910.31, has been allowed on buildings and equipment as at March 31st, 1920—this amount being added to general expenditures.

FIRE INSURANCE.

The amount of fire insurance in force at March 31st, 1920, was $198,890, distributed as follows:—

University buildings, Point Grey	$20,000 00	
" " Fairview	66,780 00	
		$86,780 00
S.C.R. vocational buildings, Point Grey	$19,100 00	
" " Fairview	14,100 00	
	33,200 00	
		$119,980 00
Library books		41,100 00
Equipment		37,810 00
Total		$198,890 00

Unexpired fire insurance premiums at March 31st, 1920, amount to $3,319.85, and this has been shown on the balance-sheet as an asset of the University.

BOOK-STORE (STUDENTS' TEXT-BOOKS).

The book-store was operated during the year under the Bursar's Department and shows a profit of $1,905.45.

PRODUCE AND LIVE STOCK AT POINT GREY.

Produce and live stock amounting to $10,989.63 was sold during the year and credited to general expenditures. In connection with live stock, the value of the increase in stock in the Departments of Animal Husbandry and Poultry Husbandry is $2,148.73 and $3,769.48 respectively. This is shown under "Assets," subheading "Live stock."

DEPARTMENT OF SOLDIERS' CIVIL RE-ESTABLISHMENT.

The University is still carrying on the administrative and instructional works in connection with vocational students under the Department of Soldiers' Civil Re-establishment, without cost to the University.

Your obedient servant,

F. DALLAS,

Bursar.

SUMMARY STATEMENT OF RECEIPTS AND DISBURSEMENTS FOR THE YEAR ENDING MARCH 31ST, 1920.

1919.			
April 1st. Balances in Bank of Montreal—			
	General Current Account		$ 36,070 94
	Trust Account No. 1		11,352 40
	Trust Account No. 2		2,534 17
	Bursar's Account		500 00
			$50,457 51
	Cash in hand, Bursar's Account		79 69
			$50,537 20
	Special Account (Co-operative Seed-growing)		117 74
	Carried forward		$ 50,654 94

RECEIPTS.

Brought forward			$ 50,654 94
Provincial Government grant—			
Vote No. 217, for year April 1st, 1919, to March 31st, 1920	$285,000 00		
Supplemental grant, April 1st, 1919, to March 31st, 1920	103,000 00		
		$388,000 00	
Fees received from students (1919-20)—			
Supplemental examinations	$ 1,365 00		
Matriculation examinations	4,303 00		
Sessional registration	6,450 00		
Short Course in Botany	100 00		
Short Course in Mining	30 00		
Graduation	880 00		
	$ 13,128 00		
Special fees—			
Late fees	$ 188 00		
Rereading and special examinations	160 50		
Duplicate certificates	2 00		
	350 50		
	$13,478 50		
Students' caution-money (returnable)	$4,118 70		
Alma Mater fees (returnable)	10 00		
	4,128 70		
		17,607 20	
Students' caution-money (1918-19) in hand (returnable)	$ 45 60		
Less students' caution-money (1918-19) (collectable)	6 70		
		38 90	
Burrell grant (Dominion "Agricultural Instruction Act")		4,000 00	
Honorary Advisory Council for Scientific and Industrial Research— Grant to the Department of Dairying for work on the grading of cream and butter in relation to the bacterial content of the cream and milk used in the preparation of these products		1,000 00	
Wesbrook Memorial Fund (per Alma Mater Society of the University of British Columbia)		217 65	
Co-operative seed-growing—Received from the Dominion Government (being balance of accounts rendered)		4 41	
Interest earned on Trust Accounts		223 15	
Produce and live stock—			
Department of Horticulture	$ 504 25		
„ Dairying	3,155 14		
„ Animal Husbandry	2,987 66		
„ Poultry Husbandry	4,342 58		
		10,989 63	
Rent of two cottages at Point Grey (occupied by Foreman of Department of Horticulture and Herdsman of Department of Animal Husbandry)		360 00	
Contractors' deposits with tenders—			
S. N. McLeod (deposit on beef-barn and Dairy Products Building)	$ 1,182 00		
S. N. McLeod (deposit on horse-barn and Stableman's cottage)	1,798 10		
		2,980 10	
Carried forward		$425,421 04	$ 50,654 94

RECEIPTS—*Continued.*

Brought forward		$425,421 04	$ 50,654 94
Land-clearing, Cook-house Account—			
Amount received from men for board at March 31st, 1920	$ 781 10		
Less expended for food and wages at March 31st, 1920	720 18		
		60 92	
Students' scholarships, prizes, and loans—			
Students' loans repaid to University	$ 250 00		
F. F. Wesbrook Prize for Essay in English (Graduating class)	50 00		
F. F. Wesbrook Prize for highest in Graduate class	50 00		
Women's Canadian Club Scholarship	25 00		
Terminal City Club Scholarship	100 00		
Shaw Memorial Scholarship	137 50		
McGill Graduates' Scholarship	137 50		
Dunsmuir Scholarship	165 00		
Women's Canadian Club History Prize	50 00		
Anne Wesbrook Scholarship	87 50		
Women's Liberal Association Prize for First-year student, highest in English Literature	25 00		
LeRoy Scholarship (University Service Club)	250 00		
		1,327 50	
Soldiers' Civil Re-establishment—			
Repayment of sundry disbursements as per amount shown on 1918-19 Statement	$ 614 13		
Amount received as at March 31st, 1920, toward general University expenditures for administration and teaching *re* vocational students	$ 9,390 21		
Less amount expended at March 31st, 1920	6,595 04		
	2,795 17		
Equipment—		3,409 30	
For allowance on Ford car (*see* Equipment, General Account)	$ 597 00		
For allowance on Ford truck (*see* Equipment, General Account)	1,204 00		
General expenditure—		1,801 00	
Refund from W. N. Sage	$ 5 81		
Less students' caution-money repaid	5 00		
		81	
Workmen's Compensation Board—For amount deducted from men's wages and due on the land-clearing work		22 60	
Total receipts			$ 432,043 17
			$ 482,698 11

DISBURSEMENTS.

Buildings and works—			
Finishing attic in Vocational Building, Point Grey		$ 715 00	
Poultry colony houses and fencing, Point Grey		2,822 03	
Dairy-barn (balance of contract and architect's fees)	$ 226 44		
Dairy-barn (installing heaters)	615 00		
		841 44	
Carried forward		$ 4,378 47	

DISBURSEMENTS—*Continued.*

Brought forward		$ 4,378 47	
Buildings and works—*Continued.*			
Hay-barn and feed-store (certified extras, plumbing, etc.)		355 35	
Science Building, Point Grey, distributed *pro rata* among R. McLean Co.'s creditors—			
Amount unexpended and held in trust	$ 8,937 58		
Amount at credit of R. McLean Co.'s account	11 32		
		8,948 90	
Bunk-house and equipment (land-clearing, March, 1920)		1,816 98	
		$ 15,499 70	
Surveying and architect's fees at Point Grey	$ 1,261 01		
Land-clearing at Point Grey (Department of Administration, June, 1919)	2,240 50		
Land-clearing at Point Grey (Department of Administration, March, 1920)	6,110 35		
Tile for land-draining (Department of Agriculture)	80 00		
		9,691 86	
Additions to Library and Chemistry Building (Fairview site)	$ 2,640 00		
Lockers in Chemistry Building (Fairview site)	1,044 00		
Fittings in Geology Building (Fairview site)	615 75		
		4,299 75	
			$ 29,491 31
Books—			
Department of Botany and Zoology		$ 79 87	
„ Botanical Gardens		112 25	
„ Book-store (students' texts)		1,482 43	
„ Classics		31 52	
„ Geology and Mineralogy		254 29	
„ Library		10,092 99	
„ Mining		5 75	
„ Modern Languages		39 45	
„ Philosophy		13 90	
			12,112 45
Live stock—			
Department of Animal Husbandry		$ 4,606 00	
„ Poultry Husbandry		35 00	
			4,641 00
Students' scholarships, prizes, and loans—			
Loans to students (Royal Institution Fund)		$ 305 00	
Scholarships and prizes (Royal Institution Fund)		1,200 00	
Scholarships and prizes (University of B.C.)		1,050 00	
Shaw Memorial Scholarship		183 35	
Women's Canadian Club Prize for Returned Soldier		25 00	
F. F. Wesbrook Prizes		100 00	
McGill Graduates' Scholarship		124 99	
Terminal City Club Scholarship		100 00	
Dunsmuir Scholarship		150 00	
			3,238 34
Alma Mater fees, 1918-19 (*see* 1918-19 statement)			72 00
Students' caution-money, 1918-19 (*see* 1918-19 Statement)			2,517 50
Students' fees' returnable (*see* 1918-19 Statement)			8 00
Co-operative seed-growing			122 15
Burrell grant (Dominion "Agricultural Instruction Act")			4,420 54
Honorary Advisory Council for Scientific and Industrial Research			883 33
Carried forward			$ 57,506 62

DISBURSEMENTS—*Continued.*

Brought forward		$ 57,506 62
Soldiers' Civil Re-establishment—		
Repayment of gasolene, oil, etc., sold (see 1918-19 Statement)	$ 865 03	
Sundry disbursements during March, 1920	509 95	
		1,374 98
Soldier Settlement Board (amount due for live stock)		40 00
F. Garnish, amount due for rent of cottage for March	$ 15 00	
T. Wallington, amount due for rent of cottage for March	15 00	
		30 00
Contractors' deposits with tenders—		
S. N. McLeod (balance deposit on garage, machine-shop, etc.)	$ 1,360 50	
S. N. McLeod (deposit on beef-barn and Dairy Products Building)	1,182 00	
Layfield & Tardiff (balance deposit on dairy-barn, bull-pen, etc.)	1,043 00	
		3,585 50
Salaries—		
Department of Administration, including President, Deans of Faculty, and Assistants	$ 12,905 11	
„ Agronomy	8,813 16	
„ Animal Husbandry	8,302 38	
„ Horticulture	7,296 53	
„ Poultry Husbandry	2,685 00	
„ Dairying	3,306 37	
„ Bursar	6,960 09	
„ Buildings and Grounds (Janitors)	6,566 00	
„ Bacteriology	1,982 00	
„ Botany and Zoology	5,183 07	
„ Botanical Gardens	4,655 00	
„ Chemistry	13,516 59	
„ Civil Engineering	4,302 84	
„ Classics	8,149 92	
„ Economics	5,279 96	
„ English	10,897 30	
„ Geology and Mineralogy	8,599 76	
„ History	4,675 79	
„ Library	5,126 77	
„ Mathematics	11,762 27	
„ Mechanical Engineering	7,834 20	
„ Mining	7,305 75	
„ Modern Languages	12,163 47	
„ Military (C.O.T.C.)	50 00	
„ Philosophy	3,000 00	
„ Physics	9,717 70	
„ Registrar	4,297 75	
		185,334 78
Furniture and equipment—		
Department of Administration	$ 7,216 03	
„ President's Office	9 00	
„ Agronomy	206 65	
„ Agriculture (General)	233 24	
„ Animal Husbandry	629 35	
„ Horticulture	598 89	
„ Poultry Husbandry	1,058 09	
„ Dairying	1,325 51	
„ Bursar	250 53	
Carried forward	$ 11,527 29	$ 247,871 88

DISBURSEMENTS—*Continued.*

Brought forward		$ 11,527 29	$ 247,871 88
Furniture and equipment—*Continued.*			
Department of Bacteriology		494 03	
„ Bacteriology		494 03	
„ Botany and Zoology		3,213 54	
„ Botanical Gardens		139 97	
„ Chemistry		1,865 39	
„ Civil Engineering		1,243 21	
„ Economics		15 75	
„ Geology and Mineralogy		1,708 60	
„ Library		391 40	
„ Mechanical Engineering		1,538 42	
„ Forest Products Laboratory		126 43	
„ Mining		2,994 88	
„ Modern Languages		106 20	
„ Physics		2,615 95	
„ Registrar		227 00	
Supplies—			28,208 06
Department of Administration		$ 2,150 50	
„ President's Office		181 38	
„ Agronomy		362 53	
„ Agriculture (General)		556 32	
„ Animal Husbandry		603 94	
„ Horticulture		1,110 57	
„ Poultry Husbandry		799 88	
„ Dairying		1,087 52	
„ Bursar		441 07	
„ Photography		5 31	
„ Bacteriology		394 36	
„ Botany and Zoology		854 71	
„ Botanical Gardens		209 28	
„ Chemistry		3,299 87	
„ Civil Engineering		99 30	
„ Economics		18 53	
„ English		10 63	
„ Geology and Mineralogy		344 73	
„ History		85 67	
„ Library		313 64	
„ Mathematics		67 55	
„ Mechanical Engineering		517 46	
„ Mining		969 10	
„ Modern Languages		47 11	
„ Military (C.O.T.C.)		24 95	
„ Philosophy		6 82	
„ Physics		337 74	
„ Registrar		1,279 61	
Expenses—			16,180 08
Department of Administration, including scholarships and prizes held in trust, travelling expenses, Convocation, Congregation, and Graduating expenses, telegrams, postages, exchange, etc.	$ 13,091 73		
Less trust funds for scholarships and prizes transferred from Current Account to Trust Account No. 2	2,430 00		
Carried forward		$ 10,661 73	$ 292,260 02

DISBURSEMENTS—*Continued.*

Brought forward	$ 10,661 73	$ 292,260 02
Expenses—*Continued.*		
Department of President's Office	35 00	
Department of Agronomy, including preparation of land for experimental purposes at Point Grey, seeds, fertilizers, freights, travelling expenses, transportation of students, postages, telegrams, etc.	7,573 88	
Department of Agriculture (General), including preparation of land for experimental purposes at Point Grey, seeds and fertilizers, feed for horses, maintenance of jitney, travelling expenses, freights, express, etc.	14,134 23	
Department of Animal Husbandry, including feed for cattle and hogs, wages at Point Grey, travelling expenses, transportation of students, freights, express, telegrams, postages, etc.	9,275 80	
Department of Horticulture, including travelling expenses, transportation of students, wages at Point Grey, seeds, shrubs, and fertilizers, feed for team, freights, express, telegrams, postages, etc.	8,537 49	
Department of Poultry Husbandry, including travelling expenses, transportation of students, feed for chickens, wages at Point Grey, freights, express, telegrams, postages, etc.	7,979 81	
Department of Dairying, including travelling expenses, transportation of students, wages at Point Grey, freights, express, telegrams, postages, etc.	1,504 23	
Department of Bursar, including telephones, fuel and heat, light and power, water rates, city scavenging, insurance premiums, freight, express, telegrams, postages, etc.	9,901 18	
Department of Photography	45 45	
„ Buildings and Grounds, maintenance and repairs	2,205 10	
„ Bacteriology	114 78	
„ Botany and Zoology	104 94	
„ Botanical Gardens	123 29	
„ Chemistry	418 34	
„ Civil Engineering	25 00	
„ Classics	2 90	
„ University Extension Work	1,113 23	
„ Geology and Mineralogy	248 42	
„ Library	528 65	
„ Mechanical Engineering	175 36	
„ Mining	118 68	
„ Physics	236 53	
„ Physical Examinations	702 53	
„ Registrar	237 56	
„ Examination Expense	1,702 02	
		77,706 13
Total disbursements		$ 369,966 15
Balances—Cash at March 31st, 1920—		
Bank of Montreal—		
General Current Account	$107,146 76	
Trust Account No. 1	1,798 10	
Trust Account No. 2	3,045 33	
Carried forward	$111,990 19	$ 369,966 15

DISBURSEMENTS—*Continued.*

Brought forward		$111,990 19	$ 369,966 15
Balances—*Continued.*			
Bank of Montreal—*Continued.*			
Trust Account No. 3		217 65	
Bursar's Account		500 00	
		$112,707 84	
Cash in hand, Bursar's Account		24 12	
			112,731 96
			$482,698 11

BALANCE-SHEET AS AT MARCH 31ST, 1920.

LIABILITIES.

Accounts payable—			
Materials ordered not yet delivered: Equipment, supplies, etc., estimated at (*see* Contra)		$ 22,434 68	
S. N. McLeod, contract for horse-barn and Stableman's cottage at Point Grey (now in course of construction)		17,600 00	
Students' caution-money, Session 1918-19 (returnable)	$ 45 60		
Less students' caution-money, Session 1918-19 (collectable)	6 70		
	$ 38 90		
Students' caution-money, Session 1919-20	$ 4,118 70		
Alma Mater fees, Session 1919-20	10 00		
	4,128 70		
		4,167 60	
Workmen's Compensation Board (account land-clearing)		22 60	
Honorary Advisory Council for Scientific and Industrial Research, balance of funds on hand		116 67	
		$ 44,341 55	
Amount reserved for buildings and land-clearing, contracted for at March 31st, 1920, as follows (*see* Contra):—			
Department of Poultry Husbandry, house for Foreman	$ 5,000 00		
„ Dairying, extension to dairy	1,575 00		
„ Agronomy, barn	11,000 00		
„ Agriculture, water-piping to barns	1,150 00		
„ „ architect's fees	950 00		
„ „ land-clearing	16,200 00		
„ Administration, land-clearing	14,000 00		
„ „ building road	3,500 00		
		53,375 00	
			$ 97,716 55
Grants from Provincial Government of British Columbia (for period from 1910 to March 31st, 1920)—			
Site for the University, Point Grey, at nominal value		$ 1 00	
Gift of museum collection, growing plants, records, etc., at nominal value		20,000 00	
Amount disbursed direct by Government		48,407 73	
Carried forward		$ 68,408 73	$ 97,716 55

LIABILITIES—*Continued.*

Brought forward		$ 68,408 73	$ 97,716 55
Grants from Provincial Government—*Continued.*			
Amount received by Governors of the University for general purposes to year 1916	$354,660 65		
Amount received by Governors of the University for general purposes for year 1916-17	200,000 00		
Amount received by Governors of the University for general purposes for year 1917-18	225,000 00		
Amount received by Governors of the University for general purposes for year 1918-19	220,000 00		
Supplemental vote for year 1918-19	46,000 00		
Special grant toward building and maintenance of Forest Products Laboratory, year 1918-19	2,500 00		
Supplemental Vote No. 175A for supplies from King's Printer for year ending March 31st, 1919	3,078 92		
Amount received by Governors of the University for general purposes for year 1919-20	285,000 00		
Supplemental grant for year 1919-20	103,000 00		
		1,439,239 57	
Amount received by Governors of the University for the completion of the Science Building at Point Grey		69,524 00	
			1,577,172 30
Gifts from individuals of equipment, books, etc., valued at			5,000 00
Trusts—			
Royal Institution for the Advancement of Learning of British Columbia Students' Loans and Scholarships Fund (established August, 1915)		$ 32,059 45	
Annual sums required to be available for scholarships and loans under the above—			
1915-16	$ 1,600 00		
1916-17	1,600 00		
1917-18	1,600 00		
1918-19	1,600 00		
	$ 6,400 00		
(Of this sum $605 is on loan to students.)			
Less scholarships paid to March 31st, 1920	3,200 00		
		3,200 00	
Shaw Memorial Scholarship	$ 275 00		
Less scholarships paid	275 00		
McGill Graduates' Scholarship	$ 137 50		
Less scholarship paid	124 99		
		12 51	
Dunsmuir Scholarship	$ 165 00		
Less scholarship paid	150 00		
		15 00	
Terminal City Club Scholarship	$ 100 00		
Less scholarship paid	100 00		
F. F. Wesbrook Prizes	$ 100 00		
Less prizes (2) paid	100 00		
Anne Wesbrook Scholarship		87 50	
Carried forward		$ 35,374 46	$1,582,172 30

LIABILITIES—*Continued.*

Brought forward		$ 35,374 46	$1,582,172 30
Trusts—*Continued.*			
Women's Canadian Club Scholarship	$ 25 00		
Less scholarship paid	25 00		
Women's Canadian Club History Prize		50 00	
Women's Liberal Association Prize for First-year Student highest in English Literature		25 00	
LeRoy Memorial Scholarship		250 00	
University scholarships and prizes—			
Amount voted by Board of Governors—			
1916-17	$ 830 00		
1917-18	830 00		
1918-19	830 00		
	$ 2,490 00		
Less scholarships and prizes paid	2,479 68		
		10 32	
Royal Institution for the Advancement of Learning of B.C.—			
McGill Graduates' Scholarship (endowment)		2,500 00	
The Shaw Memorial Scholarship (endowment)		2,500 00	
The Dunsmuir Scholarship ((endownment)		3,000 00	
The Terminal City Club Scholarship (endowment)		2,000 00	
		$ 45,709 78	
Wesbrook Memorial Fund		217 65	
Contractors' deposits with tenders		1,798 10	
			47,725 53
			$1,727,614 38

ASSETS.

Site for University—			
Granted by Provincial Government, comprising Lots 3044, 3045, 3045A, 4804, 4805, 4806, and 4807, Group 1, N.W.D. ("British Columbia University Site Act, 1919," Amendments 1913 and 1918), at nominal value		$ 1 00	
Add expenditure for surveying, clearing, and grading, etc., to March 31st, 1919	$102.806 03		
Add expenditure for year ending March 31st, 1920	4,296 51		
		107,102 54	
Land-clearing (work now proceeding), expended to March 31st, 1920	$ 6,110 35		
Less profit on cook-house at March 31st, 1920	60 92		
		6,049 43	
			$ 113,152 97
Buildings and works—			
Including general plans, Science Building under construction, docks, etc., at cost to June 30th, 1915	$ 80,809 77		
Expended for year ending June 30th, 1916	35,225 28		
Expended for year ending March 31st, 1920 (being amount held in trust for the creditors of R. McLean & Co.)	8,937 58		
		$124,972 63	
Carried forward		$124,972 63	$ 113,152 97

ASSETS—*Continued.*

Brought forward		$124,972 63	$ 113,152 97
Buildings and works—*Continued.*			
Horticultural storage-barn, Point Grey, at cost		5,053 97	
Dairy-barn, bull-pen, manure-tank, and two cottages at Point Grey, at cost		24,440 59	
Hay-barn and feed-store at Point Grey, at cost		5,914 35	
Poultry colony houses and fencing at Point Grey, at cost		6,421 05	
Horse-barn and Stableman's cottage at Point Grey (now in course of construction), at cost		17,600 00	
Bunk-house and equipment, at cost		1,816 98	
		$186,219 57	
Temporary buildings erected at Hospital site, 1915, at cost	$ 23,523 95		
Temporary buildings taken over from McGill University at valuation, Hospital site	17,379 85		
Temporary buildings erected at Hospital site, 1916, at cost	40,864 86		
Additions to Library and Chemistry Buildings, Hospital site, September, 1919, at cost	2,640 00		
		84,408 66	
		$270,628 23	
Less depreciation allowed to March 31st, 1920		77,152 03	
			193,476 20
Equipment—			
Furniture, Administration and Departmental Offices, specimens, etc., at cost to June 30th, 1915		$ 6,029 81	
Taken over from McGill University College at valuation		12,769 60	
Purchased from July 1st, 1915, to March 31st, 1920		101,301 92	
		$120,101 33	
Less depreciation allowed to March 31st, 1920		33,758 28	
		$ 86,343 05	
Museum collection—			
Growing plants, records and equipment, a gift from the Provincial Government, valued at		$ 20,000 00	
Gifts to Departments of Geology and Physics		1,000 00	
			107,343 05
Library books—			
Distributed as to departments at cost in Vancouver to June 30th, 1915		$ 25,407 80	
Gifts of books to Library, valued at		4,000 00	
Taken over from McGill University College at valuation		1,910 00	
Purchased from July 1st, 1915, to March 31st, 1920		25,830 95	
		$ 57,148 75	
Books (departmental) purchased April 1st, 1919, to March 31st, 1920		537 03	
Book-store—Students' texts on hand at March 31st, 1920		6,094 54	
			63,780 32
Live stock—			
Department of Agriculture (one team of horses)		$ 625 00	
„ Horticulture (one team of horses)		700 00	
„ Animal Husbandry (horse (entire), cattle, hogs, and sheep)	$ 11,461 27		
„ Animal Husbandry, add increases at March 31st, 1920	2,148 73		
		13,610 00	
Carried forward		$ 14,935 00	$ 477,752 54

ASSETS—*Continued.*

Brought forward		$ 14,935 00	$ 477,752 54
Live stock—*Continued.*			
Department of Poultry Husbandry (poultry)	$ 629 52		
„ Poultry Husbandry, add increases at March 31st, 1920	3,769 48		
		4,399 00	
			19,334 00
Supplies on hand at March 31st, 1920			6,309 00
Sundry accounts receivable—			
Convocation expenses, 1912-13		$ 437 85	
Corporation of Point Grey, water-mains		17,989 38	
Competition premium, architect's plans (balance)		3,500 00	
Burrell grant (Dominion "Agricultural Instruction Act"), amount expended to March 31st, 1920		1,448 04	
Department of Soldiers' Civil Re-establishment—			
Sundry expenditures during March, 1920	$ 509 95		
Amount payable on account of general University expenditures for administration, and teaching *re* vocational students	$ 6,226 44		
Less amount due on account of above	1,800 02		
	4,426 42		
		4,936 37	
Soldier Settlement Board for live stock		40 00	
F. Garnish (Foreman in Department of Horticulture), rent for March		15 00	
T. Wallington (Herdsman in Department of Animal Husbandry), rent for March		15 00	
			28,381 64
Materials ordered not yet delivered (*see* Contra)			22,434 68
Buildings and land-clearing, etc., contracted for at March 31st, 1920 (*see* Contra)			53,375 00
Unexpired insurance premiums at March 31st, 1920			3,319 85
Trusts—			
Royal Institution for the Advancement of Learning of British Columbia, eight Victory War Loan bonds, Nos. V044139-46M, for $1,000 each, bearing interest at 5½ per cent. per annum, maturing December 1st, 1922; being endowment for the McGill Graduates, Shaw Memorial, and Dunsmuir Scholarships		$ 8,000 00	
Terminal City Club, two Victory War Loan bonds, Series T, Nos. E001718 and E276690, for $1,000 each, bearing interest at 5½ per cent. per annum, maturing November 1st, 1933, and November 1st, 1934, respectively; being endowment for the Terminal City Club Scholarship		2,000 00	
Held in trust in Bank of Montreal, Trust Accounts Nos. 1, 2, and 3, Savings Bank Accounts Nos. 34004, 34366, and 45873, respectively—			
Royal Institution for the Advancement of Learning of British Columbia Students' Loans and Scholarships Fund	$ 2,595 00		
University Scholarships and Prizes Fund	10 32		
McGill Graduates' Scholarship	12 51		
Dunsmuir Scholarship	15 00		
Carried forward	$ 2,632 83	$ 10,000 00	$ 610,906 71

ASSETS—*Continued.*

Brought forward	$ 2,632 83	$ 10,000 00	$ 610,906 71
Trusts—*Continued.*			
Held in trust in Bank of Montreal—*Continued.*			
Anne Wesbrook Scholarship	87 50		
Women's Canadian Club History Prize	50 00		
Women's Liberal Association Prize for First-year Student highest in English Literature	25 00		
LeRoy Memorial Scholarship	250 00		
Wesbrook Memorial Fund	217 65		
Contractors' deposits with tenders	1,798 10		
	$ 5,061 08		
Trust funds to be repaid (students' loans)	605 00		
		5,666 08	
			15,666 08
Balance in Bank of Montreal—			
General Current Account		$107,146 76	
Bursar's Account	$ 500 00		
Balance, cash in hand, Bursar's Account	24 12		
		524 12	
			107,670 88
General expenditures, including administration and departmental salaries, supplies, travelling and other expenses, telephones, fuel and heat, power, light, water rates, fire-insurance premiums, maintenance and repairs of buildings, depreciation on buildings and equipment, examination and graduation expenses, etc. (including McGill University College grant of $10,000)—			
To June 30th, 1915		$ 66,496 31	
From July 1st, 1915, to March 31st, 1920		926,874 40	
			993,370 71
			$1,727,614 38

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

PROVINCE OF BRITISH COLUMBIA

COMMISSION ON HEALTH INSURANCE, ETC.

(Appointed under "Public Inquiries Act"
November 19th, 1919)

REPORT ON MOTHERS' PENSIONS

WITH APPENDIX

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by William H. Cullin, Printer to the King's Most Excellent Majesty.
1920.

REPORT ON MOTHERS' PENSIONS.

VANCOUVER, B.C., March 22nd, 1920.

To the Lieutenant-Governor in Council,
Victoria, B.C.

SIR,—Pursuant to Commission dated the 19th day of November, 1919, your Commissioners appointed thereunder immediately held an organization meeting and adopted an itinerary for the holding of public meetings throughout the Province. Over 1,500 notices of hearings were mailed to the following: Members of the Legislative Assembly; all branches of all soldiers' organizations, including their auxiliaries; women's organizations, Labour Unions, employers of over 100 employees, medical practitioners, Medical Associations, hospitals, Farmers' Institutes, Boards of Trade, Municipal Clerks, Lodges of Fraternal Societies, Manufacturers' Associations, insurance organizations, and individuals who were believed to have some special knowledge of the subjects under investigation. Public hearings were held in the following cities and towns: Princeton, Fernie, Cranbrook, Nelson, Rossland, Trail, Grand Forks, Prince Rupert, Golden, Revelstoke, Kamloops, Vernon, Nanaimo, Victoria, New Westminster, Chilliwack, and Vancouver.

The public was notified of the itinerary through the medium of nineteen newspapers circulating in the districts visited. The meetings on the whole were well attended and a great deal of interest shown in the subject of mothers' pensions. Nearly all women's organizations throughout the Province had representatives speak on their behalf. At all the hearings the representatives of these organizations were first requested to present their views, and then individuals presented theirs. The evidence was taken by a Court reporter and later transcribed. It comprises two volumes containing 845 pages, the originals of which will be filed with you on the termination of the inquiry into the other subjects under investigation. An inquiry was made into the operations of mothers' pensions laws in other parts of Canada and United States, and a summary of this legislation is appended to this report.

THE PRINCIPLE OF MOTHERS' PENSIONS.

The rearing of children has become recognized as one of the most responsible and precarious relationships of life. The woman in business is assured of a fairly steady and certain income to meet her needs. The mother, while engaged in rearing small children, is considered to be rendering an important service to the State, but the living provided her is dependent on the length of life of her husband, his character or health. Should he die or be sent to prison or become totally incapacitated, the mother's living is ended, save and so far as he has been able to anticipate and provide for the future needs of his family. The aim of a mothers' pension scheme is to provide financial assistance to a mother of one or more children when that mother is deprived of the support of her husband either on account of his death, desertion, total incapacity, or for other causes. The assistance is given for the purpose of making it possible for the mother to remain in her home and maintain it for the welfare of her children, instead of breaking it up and allowing the children to be placed in an institution at the public's expense. The necessity for home preservation is imperative not only for the welfare of the child, but in the interest of the State. Payments made by the State toward securing home-life for the child are made for value received in the form of services rendered by the mother in rearing her children for the State. The mother becomes the State's agent for the purpose of rearing and educating the children, and she receives assistance on their behalf for that purpose. Mothers who were deprived of their husband's maintenance through industrial accidents a few years ago, when pensions were not provided under the old "Workmen's Compensation Act," have long since used up any amount paid them. These widows and the widows of men who lost their lives in the "flu" epidemics are the victims of social calamities which, under our present system, they are expected to bear alone. The mothers' assistance scheme has as one of its principal aims the relief of such mothers for their own sakes and for the sake of providing home-life for their children.

CHILD INSTITUTIONS.

The life of a child in a State institution is more or less a closed book to the average person. The child is delivered at a tender age to an institution usually called a "home," but with the majority of qualities missing which make up home-life. On account of lack of influence these parentless children are herded into meagrely furnished quarters where they cannot be given the individual care which is so essential to the development of thought and character. Most children are understood only by their mothers. To their mothers they are very dear. A tired, worried, and overworked instructor (all institutions appear to be understaffed) does his or her best to supply parental attention; these at best are but a poor substitute for a mother, and the individual child receives but scant consideration. All children require the sympathy which only a mother can give, and when that sympathy is denied they grow up lacking an understanding of human nature which is bound to react upon them throughout life. A child who has had the benefits of a mother's love and teachings will later on weather the storms of temptation and false ideals much better than one who has been deprived of this necessary factor in his development through having been reared in an institution. The mother is in sympathy with her child and acts as its constant teacher, whereas teaching in an institution is of a routine character and necessarily lacks the exchanges of confidences so essential to the development of a child's mentality.

Most institutions where children are brought up are not large enough to have a resident physician or trained nurse. Thorough medical inspections are rarely made and physical defects, even when noted, frequently, for lack of funds, go uncorrected. Adequate dental care is seldom provided. Personal instruction in the establishment of habits of cleanliness and health is frequently neglected. Soap, towels, wash-cloths, brushes, and combs are generally used in common by the children, and this tends to the spread of infectious diseases. Bathing facilities are inadequate. Habits of unclean mind spread among children. Unsuitable garments are worn. The coarsest bedding is used. Bleak and barren buildings, usually in undesirable localities, house these children and afford little inspiration to an impressionable child. The result is we have an "institutionalized product" lacking normal training, without individuality, and quite unprepared for the tasks and trials which lie before him.

ARGUMENTS FOR AND AGAINST MOTHERS' PENSIONS.

The general criticisms of Mothers' Pension Acts as operated elsewhere were summarized at a Conference on Social Insurance held in Washington in 1916, and are to the effect:—

(1.) That pensions tend to pauperize the individual on the one hand, and, on the other, offer a corrupting possibility to office-holders, while at the same time tending to relieve relatives and friends of moral responsibility at the taxpayers' expense:

(2.) That the administration of relief to dependent families can better be done by private agencies, because more attention is given to investigation and to proper supervision; that the services of friendly visitors and of trained and experienced social workers are needed; that it is comparatively easy to raise money from private sources for dependent mothers who are mentally and morally fit and otherwise efficient home-keepers:

(3.) It is urged that social insurance or some other more equitable and satisfactory system should be evolved which would meet the twofold object of relief and prevention.

Advocates of the mothers' pension form of administration admit there is an element of truth in the first objection enumerated, but they contend that private agencies have not a record for administration equal in efficiency to that under Government control and supervision. These private agencies have not yet satisfied the public of their ability to meet the need. Forty-two States and Provinces have considered it advisable to place mothers' pensions under Government control. Private charities are always complaining of deficits. They cannot assure a mother with little children, whose need will extend over long periods, that she can place dependence on a definite monthly amount to keep her from worry, strain, and premature break-down. A system of mothers' pensions should provide at least for one woman on each investigating committee or Local Board, who could do as much visiting as the recipients of the pension might require. It is possible that social insurance might make special provision to meet the needs of indigent

mothers, but the chief objection to this arrangement would be that the cost of mothers' pensions is usually considered to be a municipal and State expenditure, while the cost of social insurance is generally divided among the employer, employee, and the State.

Among the benefits that would be expected from a Mothers' Pension Act would be:—

(*a.*) The maintenance of the home, thereby providing maternal care and moral influence for the children:

(*b.*) An improved physical and educational standard:

(*c.*) The arresting of juvenile delinquency and tendency toward criminality:

(*d.*) The removal from the mother of temptation to dishonesty or immorality:

(*e.*) The improvement of the physical condition of the mother through the provision of proper food, clothing, and shelter, and by diminishing the fear of want:

(*f.*) The assurance to the mother that she will not be forced to lose her children because she has lost her husband:

(*g.*) The reduction of the number of inmates in child institutions and the consequent saving in the cost of upkeep of these:

(*h.*) The recognition of the obligation of the State to women who become the mothers of its future citizens:

(*i.*) The systematic investigation of needy cases and the discharge of the duty of the State to those mothers and children:

(*j.*) The elimination of the stigma of "charity" begotten by dependence upon relief given by private individuals and child-welfare organizations and the fostering of a wholesome spirit of self-respect.

MOTHERS' PENSIONS A RECENT DEVELOPMENT.

Mothers' pensions in America are of comparatively recent origin. Missouri, Illinois, and California led the way in 1911. Their schemes met with general success, and pension laws, though differing in detail, are in force in thirty-nine of the United States of America and in Alaska and Hawaii. The Provinces of Manitoba, Saskatchewan, and Alberta have mothers' pension laws in force, and the Ontario Legislature now has the question before it for consideration. A brief summary is given below of the laws operating in our Prairie Provinces and an outline of the proposal as recommended for Ontario.

Manitoba.—In this Province, where the "Mothers' Allowance Act" has been in force for nearly three years, there were in October last 351 families drawing benefits averaging $54.51 per month per family. The total cost for the second year of the operation of the Act was $81,284.95, but it is expected that the expenditures will run higher for the current year. The allowances made are claimed to be the highest in America. The regulations provide that "while each municipality must appoint a committee of not less than three persons, of whom one must be a woman, five in most places would be advisable, two of whom should be women, whose duty it is to receive applications for allowances, investigate all applications received, forward a complete record of all investigations to the Provincial Government, and supervise every family receiving an allowance. Members of municipal committees receive no remuneration beyond expenses."

Saskatchewan.—In this Province there were at the end of February of this year 180 widows and 664 dependent children receiving benefits under the "Mothers' Pension Act," averaging $25 per month per family, the cost for the year being $54,000. The maximum allowed is $30 per month per family.

Alberta.—At the end of last year this Province was making allowances to 244 widows and 800 children, averaging between $37 and $38 per month per family, and amounting to $111,264 for the year. The Act provides "there shall be appointed by the Council in every city and town in the Province one or more inspectors whose remuneration shall be fixed and paid by the Council, and whose duty it shall be to receive applications for assistance under this Act; to inquire into any case brought before his or her attention, and generally to do and perform such matters and things as may be required by this Act, or by any regulations passed thereunder."

Ontario.—The proposed scheme which has been placed before the Legislature by expert investigators provides for a central bureau to supervise the work of the committees provided by municipalities for local administration. The Government will pay the expenses of head-

quarters and will make an annual grant for payment of allowances. Each municipality will be expected to pay half the allowance for recipients in its district. If the widow has an income of sufficient amount she will be ineligible to share in the allowance. Widows with two or more children under fourteen years of age will receive an allowance that will be sufficient to meet the cost of living. The proposals do not fix any maximum allowance per family other than that to be determined by the cost-of-living budget. The mother and dependent children are permitted to participate even if they own property up to $2,000 or cash or securites (other than household goods) up to $500. The recommendations call for the Act to be administered by a Provincial Committee of five members who are paid per diem allowance only during the time of the regular sessions. This committee is to enlist local co-operation in all centres. It is recommended that widows, wives of inmates of insane asylums, and wives of men who are totally incapacitated should participate. Divorced women, wives of prisoners, and unmarried mothers are not included.

THE DEMANDS OF THIS PROVINCE.

The need for mothers' pensions was drawn very forcefully to the attention of the Commission by the various witnesses who testified at its hearings in all parts of the Province. State assistance for indigent mothers of young children was endorsed by seventy-seven women's organizations, twenty-four fraternal societies, thirty-four labour organizations, six other organizations, ten ministers of the gospel, thirteen doctors, four insurance agents, and forty-six private individuals. Witnesses everywhere welcomed the idea of granting pensions to those mothers who, through no fault of their own, found themselves unable to support their children and educate them to become useful citizens. No witness anywhere appeared before the Commission in opposition to the principle of mothers' pensions. Regrets were expressed on all sides that the subject of mothers' pensions had not been investigated long ago. Widespread demand was made for the immediate crystallizing into legislation of recommendations along the lines set out in this report. A profound conviction was shown by the public-spirited citizens for progressive legislation in keeping with the spirit of the times.

It is generally recognized that, with the cost of living as high as it is, the average wage-earner cannot from his income make adequate provision, in the event of incapacity, to guarantee the maintenance of his home and the education of his children. In such event he must necessarily leave their upbringing and education to the mercy of the State. These children, if they receive proper home care and education, will make the useful citizens of to-morrow. It can therefore be seen that public funds spent on education cannot be considered as philanthropy. The vast sums of money spent annually on education is primarily in the interest of the State itself, it being apparent that the more enlightened the individual becomes, the more enlightened and progressive the State. The benefit to the individual must be achieved in order to accomplish the greater benefit and advancement to the State. Before school age is reached education by the State of her dependent and neglected children should be along hygienic, mental, and moral lines. This can only be accomplished by supplying to the mothers, guardians, or institutions entrusted with the care of these children sufficient financial assistance "to enable every child to get the sporting chance to make good," so often referred to by the Prince of Wales in his sporting addresses on the functions of the State.

The late Theodore Roosevelt once said that "unless this place is made a good place for *all* of us to live in it will not be a good place for *any* of us to live in." We must make it a good place for the children of our hapless sister or it will not be a good place for our own children. In order to make it such a place we must do everything within our power to remove the obstacles which confront the penniless widow in her efforts to secure for her children the inalienable right of opportunity with those more fortunately situated.

COST.

With a view to arriving at the number of women and children who might make claim for benefits under a Mothers' Pension Act, the Commission carried on investigations through municipal clerks, police, and women's organizations of the Province. From fifty-three municipalities, representing 91 per cent. of the population of the Province, reports show 258 widows and 593 children as probable applicants for State assistance. If this average prevailed throughout the unreported districts there would be 284 widows and 652 children in the dependent class. Your Commission is of the opinion that this number would be reduced could a more careful inquiry

have been made into each case. Such inquiry under this Commission would have been impracticable. We are of the opinion that a number of these cases reported are now in receipt of pensions under the "Workmen's Compensation Act" or under the "Pensions Act" of Canada.

The following table shows the cost of supplying mothers' assistance in the various States and Provinces enumerated below:—

State or Province.	Population Last Census.	Number of Families benefiting.	Number of Children benefiting.	Total Expenditure.	No. of Indigent Families per 1,000 Population.	Average Monthly Allowance per Family.
California	3,578,858	3,000	8,000	$ 540,000	0.66	$15.00
Idaho	340,073	258	652	43,235	0.76	14.00
Montana	954,314	358	980	102,060	0.38	23.70
New Jersey	2,844,342	1,660	4,346	301,454	0.59	15.00
New York	8,496,537	7,411	21,339	1,891,929	0.87	21.00
Oklahoma	1,429,537	648	1,949	66,535	0.46	8.57
Pennsylvania	7,665,111	1,816	6,408	306,276	0.24	14.00
Wisconsin	2,333,860	2,051	6,098	309,814	0.89	12.50
Maine	363,487	218	629	46,383	0.66	17.80
Manitoba	455,614	351	....	81,284	0.78	54.51
Saskatchewan	485,432	180	664	54,000	0.36	25.00
Alberta	374,663	244	800	111,000	0.66	38.00

From the foregoing table of the twelve States and Provinces enumerated this Province might expect 243 families to be found in the indigent class. On the estimate of our own three Prairie Provinces 235 families might qualify for assistance. The cost of such assistance at the rate of $55 per month per average family would be $155,100, of which the municipalities should pay one-half. The Ontario investigators estimate in various ways the cost of mothers' pensions to that Province. These estimates run from $383,745 to $1,027,064. On a similar basis British Columbia might be expected to pay anywhere between $59,960 and $160,479.

ADMINISTRATION PROBLEMS.

In this Province, where Juvenile Courts exist only in the larger centres and where the County Court holds sessions only in a limited number of cities and towns, it would be inconvenient and inadvisable to have the Act administered through either of these Courts. The preferable and more economical system adopted by many of the American States and by Alberta and Saskatchewan is by a responsible and experienced Superintendent in one of the Government departments. This Superintendent with necessary assistants need be the only salaried officials. Regulations made by the Lieutenant-Governor in Council should prescribe, limit, or extend the powers of the Superintendent, and could adopt the necessary forms and the nature of reports required from the applicants for relief and from the Local Boards receiving applications.

Local Boards in each muncipality should receive all applications for assistance within their municipality, give these applications prompt and thorough investigation, and pass their recommendations and correspondence on to the Superintendent. The homes of women receiving benefits should be visited periodically by a member or members of the Board, preferably women, to see that proper home-life is being maintained, the health of the children safeguarded, and that those of school age are making satisfactory progress. The assistance granted should not cover a longer period than six months without a renewal of application. Any change in the financial or other status of the assisted families should be reported promptly by the Local Boards. The Local Boards should consist of one member appointed by the Provincial Government, one by the Municipal Council, and a third selected at a meeting of the women's organizations of the municipality called by the Chairman of the School Board, or failing a selection, then such member could be appointed by the School Board. The work of the Local Board would not be burdensome and the position should be honorary rather than remunerative. Throughout the Province there should not, according to the law of average, be more than sixty indigent families per 100,000 population. In a municipality of 3,000 or 4,000 people it would not be an irksome duty for the Local Board to keep in intimate touch with the two or three families assisted. Abuses under this scheme would be reduced to a minimum by having the representatives of the Local Boards selected from among local people, who would thereby have an intimate knowledge of the conditions existing in the particular families.

Since nearly the entire population of British Columbia is resident in the municipalities, any pension scheme should utilize local machinery for the purpose of investigating the cases coming up for consideration. In only three or four municipalities does the population exceed 15,000 people. In these the relief officers, under the supervision of the Municipal Councils, have at present a fairly complete knowledge of all cases of genuine need. In the smaller municipalities the police, the members of the Municipal Council, and the School Board are usually familiar with the history and financial standing of all needy and worthy residents of their communities. With a little instruction in the provisions, aims, and administration of the Act, Local Boards could efficiently carry on the work assigned to them.

Since one of the chief aims in giving assistance to indigent mothers is to guarantee to their dependent children proper care while securing an elementary education, the administration should come under the Department of Education. The Superintendent appointed to administer the Act should devote his or her whole time to the work of organizing the Local Boards, instructing them in their duties, checking their recommendations, keeping awards uniform, and in maintaining a central office in which a complete record of every case is kept.

At the present time the municipalities are carrying on a limited amount of relief-work among dependent mothers. Any system should recognize the responsibility of the municipality for a portion of the cost of education of children. The Commission believes that the contribution by the municipality should be one-half of the allowance provided under the Act, the Province to bear the other half as well as the cost of administration. All allowances should be made through the office of the Superintendent and a refund subsequently made by the municipality to the Provincial Treasury. Inasmuch as the municipality and the Provincial Government will both be contributing under the Act, both should have representation on the Local Board.

RECOMMENDATIONS.

After a close examination of the laws operating elsewhere, and after studying the needs of this Province, we recommend that a scheme for mothers' assistance should be along the following lines:—

1. That an application for assistance should be considered from any indigent person who is:—

(*a.*) A widow; or
(*b.*) A divorced woman; or
(*c.*) A married woman whose husband is an inmate of a penal institution or a Government mental hospital in this Province; or
(*d.*) A woman whose husband is totally incapacitated from work through sickness or accident arising in this Province; or
(*e.*) A deserted mother; or
(*f.*) An unmarried mother; or
(*g.*) Any other person whom the Superintendent may deem to constitute a case for assistance within the meaning of the Act:

Provided that said indigent mother makes application to the Local Board in the municipality in which she has been a resident for at least six months immediately prior to becoming indigent, but no such indigent person should receive benefits under the Act unless:—

(1.) Applicant is a British subject; and
(2.) Has been a resident of this Province for eighteen months prior to becoming indigent; and
(3.) In the case of a mother, having one or more children under the age of sixteen living with her; and
(4.) Applicant is, in the opinion of the Superintendent, a person of good moral character and a fit and proper custodian for such child; and
(5.) That it is in the best interest of said child or children that applicant have custody of them; and
(6.) That applicant is without the necessary means with which to support such child or children.

2. All applications made by persons for benefits under the Act should be verified by statutory declaration, and should contain the following information:—

(*a.*) Applicant's name, the date of death, divorce, desertion, incapacity, or incarceration of the father of the children to benefit, the father's name, the names of the children, the dates and places of their birth, and the time and place of applicant's marriage (if any):

(*b.*) Applicant's residence and length of time that she has been a British subject, a resident of the Province, municipality, and the address or addresses of her place or places of abode for the five years prior to making application, and showing dates as nearly as can be of the various changes of address:

(*c.*) A statement of all property belonging to applicant and to each of the children, which statement should include any future or contingent interests which any proposed beneficiary may have:

(*d.*) The names, relationships, and addresses, as far as possible, of applicant's relatives and those of the father of the children to benefit.

3. All applications should be made in duplicate; one copy to be kept on file by the Local Board and the other to be forwarded by the Local Board to the Superintendent, together with necessary recommendations signed by the members or a majority thereof. If satisfied that the case is a proper one for assistance under the Act, the Superintendent should recommend to the Minister of Education payments in monthly instalments to the applicant as to the Superintendent may seem fit and necessary. When any such recommendation is approved by the Minister of Education, the applicant mentioned therein may be paid out of the moneys appropriated by the Legislature for that purpose the sum specified in the recommendation. The Superintendent should keep a complete and proper record of all moneys expended, and at the end of every three months should cause to be forwarded to each municipality a statement of all moneys expended during the next preceding three months in respect of any persons held to be residents for the purposes of the Act in such municipalities; and the municipalities should forthwith reimburse the Government for the amount so shown to be due. Power should be given municipalities to levy a special tax to finance their share of the cost.

4. In unorganized districts the Superintendent should make or cause to be made inquiries as to the necessity of rendering assistance under this Act to any applicant who is a resident of an unorganized district and who, if a resident of a municipality, would have been entitled to apply for assistance; and the Superintendent could in such cases make recommendations to the Minister of Education that relief be granted; in the event of the same being granted, one-half of the total cost should be borne out of the consolidated revenue of the Province and the other half to be taken out of the taxes collected in the unorganized districts. For the purposes of administration an applicant should be considered to be a resident of the municipality or unorganized district in which she was last a resident for a period of six months immediately prior to becoming indigent. In case of dispute as to whether or not the applicant is a resident of a particular municipality or district the decision of the Superintendent should be final.

5. Assistance under the Act should not exceed in any case the sum of $42.50 per month for a woman and one child and $7.50 per month for each additional child. Assistance should cease in case of remarriage of the mother or her removal from the Province.

6. No sum payable as an allowance should be capable of being assigned, charged, or attached.

7. In the event of death of any mother the assistance should cease, but an allowance not exceeding $7.50 per month for each child might, on the recommendation of the Superintendent, be made to the guardian of such children; provided that if a dependent female relative of the children or other person approved by the Superintendent for the purpose continues to maintain the home of the deceased mother for the express benefit of the orphan or half-orphan children, such dependent relative or approved person may, on the recommendation of the Superintendent, receive the full award which would have been paid to the deceased mother.

8. No assistance should be allowed to any applicant if it is shown that the applicant and proposed beneficiaries are individually or jointly the owners of real estate of an assessed value greater than $1,500 and $500 in cash or convertible securities (exclusive of necessary household furniture), or to any person who is in receipt of a pension or other award or allowance under the "Workmen's Compensation Act," "Pensions Act," or other Act, or from any source, except in so far as such pensions, award, or allowance is smaller in amount than the amount which would be payable under the Act, and assistance should only continue so long as the recipients thereof are residents of the Province.

9. A special maternity allowance not in excess of $50 should be made to any assisted mother who gives birth to a legitimate child during her dependency, and such child should be placed on the list of beneficiaries at once and monthly allowances made for it under the Act.

10. It is further recommended that the Act be known as the "Mothers' Assistance Act," and that by reason of its urgency and the insistent demand this Act be introduced and passed at the present session of the Legislature.

All of which is respectfully submitted.

CECELIA SPOFFORD.
T. BENNETT GREEN.
D. McCALLUM.
E. S. H. WINN,
Chairman.

APPENDIX.

SUMMARY OF MOTHERS' PENSION LAWS IN UNITED STATES AND CANADA.

State.	Persons benefited.	Length of Residence.	Amount paid.	How computed.	Cost borne by	How Fund is administered.
Alaska	Widows, women divorced, or whose husbands are in penitentiary, asylum, or crippled, with children under 17	No provision ...	$15 per month first child and $10 per month others	Straight cash grant	All by State (apparently no counties)	Juvenile Court hears all cases and makes awards. Re-examination at least yearly.
Arizona	Widowed mother with one or more children under 16	Citizen of U.S.A. one year and husband a resident of State at death	Not to exceed $20 per month first child, $15 per month second child, and $10 per month others; in all not to exceed $60	Ditto	All by county.....	Application is made to Board of Child Welfare appointed by Judge of Superior Court of county, without salary; the Superintendent of Poor must be on Board.
Arkansas	Woman whose husband is dead, permanently deserted, or incapacitated from work, or in gaol or asylum, and who has children under 16	Woman a citizen of U.S.A. and one year in county	Not to exceed $10 per month first child and $5 per month others	„	„	Juvenile or County Court hears all applications and a Court officer investigates the conditions. He is Probation Officer.
California	Children, orphans, or half-orphans under 15	Children born in State or who have resided there two years	State grants $120 per year to certain institutions and counties for maintaining children, and mother may apply to county for $120 if she wants to look after her child herself	„	State pays $120 per year per child and county pays balance (if any)	State Board of Control supervises books, etc., of counties and institutions.
Colorado	Parent or guardian of any neglected or poor children	No provision ...	According to need in each case	„	State homes provided for homeless children; contribution also made by city and county not to exceed ⅛ of 1 mill in taxation	By Juvenile Court in counties with over 100,000 population, otherwise by County Court; Probation Officer assists in investigation and files report with State Board of Charities. Maternity benefits raised by county tax are administered by same Court in amounts as needed in special cases.
Connecticut	Widow with dependent children under 16	Widow must have fixed residence in State	Varies in each case. Food: Widow, $2 per week; children (14), $1.75 per week; children (5-14), $1.25 per week; children (under 5), $1 per week. Fuel, $1 per week. Clothing, $1 each. Rent, according to need. Funeral expenses	„	One-third to State, one-third to county, and one-third to municipality	Municipal Executive Officer, County Commissioner, and State Agent. The State Agent gets $3,000 a year and expenses. Apply to Executive Officer of municipality. This officer makes investigations monthly and reports to county authority for O.K., who reports to State Agent for O.K. List not printed.

SUMMARY OF MOTHERS' PENSION LAWS IN UNITED STATES AND CANADA—*Continued.*

State.	Persons benefited.	Length of Residence.	Amount paid.	How computed.	Cost borne by	How Fund is administered.
Delaware	Mothers of children under 14 whose father is dead, has abandoned his family, or is physically or mentally unfit to support them	Mother must have resided in State three years	$9 per month first child, $5 per month others, and extra for sickness	Com. may supply food and clothing instead of money if they think case warrants it	Administration by State. County pays cost, but State reimburses each county up to $5,000 annually. Total cost to State not to exceed $18,000 per year	Mothers' Pension Commission of nine women, three from each county, who serve for expenses only; appointed one, two, and three years; investigate cases and report to Commission of the county where mother resides.
Florida	Mother or guardian of one or more orphans or half-orphans under 16; mother must be proper person to bring up children	Four years in State, one year in county	Not to exceed $25 per month first child and $8 per month others	Cash grant	County levies tax not to exceed ½ of 1 mill	County School Attendance Officer receives application and makes recommendations to County Commissioners.
Hawaii	Children of indigent, widowed, or abandoned mothers, married or unmarried	No provision ...	Amount payable at discretion of Board	"	Counties appropriate funds as required	Board of Child Welfare, three men and two women, appointed by Governor—two for four years and three for two years to start and afterwards for four years. Expenses only paid. New order every six months.
Idaho	Mothers of one or more children under 15 whose father is dead, in penitentiary or asylum in State	Two years in county	$10 per month first child and $5 per month others, living with mother	"	County pays all.....	Probate Judge of each county makes all provisions.
Illinois	Mothers whose husbands are dead, permanently incapacitated, physically or mentally, and with child or children under 14	Mother three years in county, or if husband dies in county and mother a citizen of U.S.A.	Not to exceed $15 per month first child and $10 per month others, living with mother	"	County pays all out of special tax	Juvenile Court, or where none the County Court Officer, examines into conditions of home. He is Probation Officer. Separate petition filed for each child. also payment may be made for sick children between 14 and 16 years of age.
Indiana	Children under 15	No provision ...	Home is maintained for children, or if Board thinks advisable an award may be made to mother or guardian of an amount not to exceed usual per diem cost of child in home—i.e., 50 or 60 cents per day	.....	County pays all.....	County Commissioners Board.
Iowa	Children who for any reason are homeless or abandoned, dependent for support on public, without proper parental care or guardianship, or children under 16 of a poor mother	No provision ...	Child committed to State institution, or amount not exceeding $2 per week to be paid direct to mother	Support of institution or cash grant	"	District and Superior Courts hear and determine all cases. Any reputable person may file affidavit as to any child's condition. Custodian of child is summoned to produce child in Court. Probation Officer investigates.

Kansas	Mother of child or children under 16 who is unable to provide for them on account of father being in penitentiary or asylum	*Bona-fide* resident of county for two years	Not to exceed $25 per month per family	Cash grant	County pays all.....	County Commissioner receives applications and administers funds. Increase is allowed temporarily in case of sickness.
Maine	Mother of child or children under 16; must be of good character and fit person and living with children	Five years' residence in State	To be finally determined by State Board	Cash or its value, or both	Municipality pays all and is reimbursed by State to extent of one-half	State Board serves without compensation. It oversees work of Municipal Boards, which are composed of three members or more, and which also serve free. Municipal Boards investigate cases and recommend amount.
Maryland	Mother of child or children under 14 whose father is dead or unable to support children	Three years' residence in county	$12 per month first child, $10 per month second child, and $8 per month others; in all, not to exceed $40	Cash grant	County pays all.....	Board of Mothers' Relief consists of three members for Baltimore City, and County Commissioners examine, elsewhere, applicants under oath.
Massachusetts ..	Mother of dependent children under 14 living with children	Three years' residence in State	Overseer estimates need and sends in recommendation on basis of difference between earnings and expenses	„	State reimburses municipality one-third	Overseer of Poor investigates and tries to get relatives to help. State Board supervises the Overseer's work. Overseer visits every three months.
Michigan	Mother of child under 17 of good character, whether husband in penitentiary or asylum	Children must be residents of county	$3 per week per child, not to exceed $6 per week per family	„	County pays all out of school tax	Probate Court decides on all applications. Governor appoints an agent in each county to investigate and receive applications and keep in touch with Truant Officer and teachers.
Montana	Children under 16 and must live with dependent mother where husband is dead, in penitentiary or asylum, or if disabled in the State	Citizen of U.S.A. and resident of county one year	$20 per month only child, $15 per month first child if more than one, $10 per month second child, and $5 per month others; in all, not to exceed $50 per month	„	County pays all.....	Application to be made to County Attorney, who files it with District Judge. Re-examination twice yearly.
Minnesota	Mother of child or children under 16 if husband dead, in penitentiary or asylum. Grandmothers are considered as mothers if caring for grandchildren	Mother a citizen of U.S.A. or been a resident of State two years and county one year	At discretion of Judge..	„	General fund of county. State reimburses to extent of one-third	Juvenile Court investigates, makes award, and imposes conditions if necessary. County Welfare Board assists if called upon by Court. State Board of Control superintends all administration.
Missouri	Dependent mother with child or children under 16 living with children	Mother must be resident of county one year	$16 per month first child and $8 per month others; total not to exceed $40 per month	„	County pays all.....	County Court with assistance of Board of County Welfare (if any) investigates every six months. Expectant mothers may receive grant for expected child three weeks before birth.
Nebraska	Dependent mother with children under 14 where husband is dead, in penitentiary or asylum, or sick children under 16	Two years' residence in county	Nothing for first child and $10 per month others; in all, not to exceed 50 per month	Cash award.....	County tax not to exceed 3/10 of 1 mill	Juvenile Court has assistance of Probation Officer and unpaid committee.
Nevada	Dependent mother with children under 15	Mother and children must reside in county	$25 per month first child and $15 per month others; total not to exceed $55 per month	„	County pays all.....	County Commissioners investigate and make award.

SUMMARY OF MOTHERS' PENSION LAWS IN UNITED STATES AND CANADA—*Continued.*

State.	Persons benefited.	Length of Residence.	Amount paid.	How computed.	Cost borne by	How Fund is administered.
New Hampshire..	Dependent mother with child or children under 16 living with her	Mother must be resident of town	$10 per month first child and $5 per month others	Cash award.....	Paid out of school funds	Petition is filed with School Board of town, and the School Board investigates and makes recommendation to State Board of Education.
New Jersey	Widow of child or children under 16	Mother must have legal settlement in county five years	Not to exceed $9 per month one child, $14 per month two children, and $4 per month others	,, ...	County pays all.....	Juvenile Court investigates.
New York	Widowed mothers with dependent children or child under 16	Two years in county or city and husband resident U.S.A. at death	Not to exceed the amount it would cost to keep children in institution	,, ...	City or county making award	Local Board of Child Welfare in each county and city of seven or nine members appointed by County Judge without compensation. Awards must be renewed every six months.
North Dakota ..	Dependent woman with child or children under 14	Resident of county one year	$15 per month for each child	,, ...	County pays all.....	County Court hears applications and notifies county authorities of award.
Ohio	Dependent mothers where husband is dead or deserted for three years and leaving children of "school age" with mother	Resident of county and State two years	Not to exceed $15 per month first child and $7 per month others	,, ...	County pays all on tax not to exceed ⅛ of 1 mill	Juvenile Court makes award. Revision of order every six months.
Oklahoma	Dependent mothers with child or children under 14 living with her	Resident of county for one year	$10 per month one child and $5 per month others	,, ...	County pays all.....	Board of County Commissioners administers funds.
Oregon	Dependent mother with child or children under 16	Three years in State, one year in county, and citizen of U. S.A.	$10 per month one child and $7.50 per month others; not to exceed in all $40 per month	,, ...	,, ...	Juvenile or County Court. Property worth $500 bar to grant. If father in State institutions, that constitutes residence for mother.
Pennsylvania ..	Poor and dependent mother of proved character and ability with child or children under 16 living with her, with husband dead or permanently confined to institution for insane	Mother resident of State two years and county one year	Not to exceed $20 per month first child and $10 per month others, including unborn child	Direct payment to recipient	Counties are graded by population for purpose of sharing in State appropriation. If counties wish to share in State appropriation they must put up sum equal to State appropriation. State pays administration	Governor appoints State Supervisor with salary and Board of Trustees in each country (five or seven women) on advice of State Supervisor. Supervisor is field organizer and is on educational staff of State. Teacher of school must O.K. school-child's progress. Supervisor is woman and she visits counties twice a year at least. Her salary is $2,400 and expenses.
South Dakota ..	Dependent mothers with one or more children under 16. Divorces of State included	Residence in State one year, county six months	Not to exceed $15 per month first child and $7 per month others	Cash award.....	County tax not to exceed ⅛ of 1 mill	County Court investigates and makes award.

Tennessee	Dependent mother whose husband is dead or disabled, mentally or physically, and leaving children or child living with mother	Citizen of U.S.A. and two years in county	$10 per month first child and $5 per month others	Cash award.....	County pays all, but total not to exceed $4,000 annually per county	Juvenile Court investigates and makes award.
Texas	Dependent mothers with child or children under 16	Five years in State, two years in county	$12 per month one child, and $18 per month two children, and $4 per month others; or county look after children in institutions	,, ...	All by county.....	Board of County Commissioners investigates and makes award.
Utah	Dependent mother or one or more children living with her	Resident of county for two years	$40 per month regardless of number of children	Cash grant	By county, but shall not exceed $10,000 annually per county	County Commissioners investigate and make award.
Vermont	Dependent or neglected children	No provision ...	$2 per week per child..	Cash award or child is sent to home or institution	Half by town and half by State Board	State Board of Charities and Probation, consisting of five members (appointed for five years without salary). Applications made to County Court, which makes award. Overseer of Poor reports cases in each town. Secretary devotes all time to keeping State records. Medical aid provided when necessary.
Virginia	Dependent widowed mother of child or children under 16	Three years in State, two years in county	Not to exceed $12 per month one child, $18 per month two children, and $4 per month others	Cash award.....	County pays all.....	Board of Supervisors of county hears petitions and makes awards.
Washington	Destitute mothers of children under 15	Ditto	$15 per month first child and $5 per month others	,, ...	,, ...	County Commission pays on award of Juvenile Court.
West Virginia ..	Dependent mother of two or more children under 13	Citizen of U.S.A. five years and State and county three years	$15 per month two children and $5 per month others	,, ...	,, ...	County Court investigates and makes award.
Wisconsin	Dependent mothers or grandparents with child or children under 14, or 16 if unemployed	Resident in county one year	Not to exceed $15 per month first child and $10 per month others; not to exceed $50 per month	,, ...	County pays, but gets assistance from towns of over 100,000 population and one-third from State	County Court or Juvenile Court may appoint a Board of Child Welfare to assist it without salary (mother to report to Court monthly).
Wyoming	Dependent mother of children under 14 living with her, and if father is dead, deserted, in penitentiary, or incapacitated in the State	Mother a resident at death	$20 per month first child and $10 per month others	,, ...	County pays all.....	Board of County Commissioners makes award. Applications are made to Probation Officer. Order renewed every six months.

SUMMARY OF MOTHERS' PENSION LAWS IN UNITED STATES AND CANADA—*Continued.*

State.	Persons benefited.	Length of Residence.	Amount paid.	How computed.	Cost borne by	How Fund is administered.
Alberta	Widow or woman whose husband is in insane asylum, leaving boys under 15 and girls under 16	One year municipality	At discretion of Superintendent of Neglected Children	Cash award.....	Province pays the woman and bills the municipality every three months for half the cost. Municipality raises funds by special tax out of regular taxes	Each municipality appoints a paid inspector. He receives all applications for assistance, investigates, and reports to Superintendent of Neglected Children, who advises Attorney-General of the amount required weekly for support. In municipalities outside cities and towns the Superintendent investigates direct. Superintendent is the judge of which municipality is the residence of any applicant in case of dispute.
Manitoba	Widowed mother or if husband in prison or asylum or physically disabled	Husband a Canadian citizen	Food. Clothing. Adult .....$9.50 $5.50 Child (1-3) 3.50 1.50 „ (4-6) 4.50 2.50 „ (7-10) 5.50 3.00 „ (10-14) 7.00 4.00 per month is amount agreed to be paid at present	Cash grant on basis of cost of food and clothing for children at various ages	Paid by Provincial Government, but all may be ordered to be paid back by the municipality	Lieutenant-Governor in Council appoints a Mothers' Allowance Commission. Municipalities may appoint local committees of three to co-operate and investigate and recommend. Cash assets of over $200 is bar to participation. Male boarders not permitted. Co-operation sought from relatives.
Saskatchewan ..	Dependent widowed mother, who is proper person to have custody of children	Resident in municipality one year	At discretion of Superintendent of Neglected Children	Cash award.....	Provincial Government pays the widow and demands $3 per week back from municipality	Superintendent of Neglected Children recommends amount needed in each case. He notifies municipalities and they keep him posted of any change in widow's condition.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

PROVINCE OF BRITISH COLUMBIA

REPORT

OF THE

COMMISSIONER OF FISHERIES

FOR THE YEAR ENDING DECEMBER 31ST, 1919

WITH APPENDICES

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I beg to submit herewith a report reviewing the operations of the Provincial Fisheries Department for the year ending December 31st, 1919, with Appendices.

WILLIAM SLOAN,

Commissioner of Fisheries.

Provincial Fisheries Department,

Commissioner of Fisheries' Office,

Victoria, British Columbia, March 31st, 1920.

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FISHERIES COMMISSIONER'S REPORT FOR 1919.

Value of Canadian Fisheries and the Standing of Provinces.

The value of the fishery products of Canada for the year ending December 31st, 1918, totalled $60,250,514, as against $52,312,044 for the preceding year, notwithstanding that the latter was considerably greater than in any preceding year.*

During the year 1918 British Columbia contributed fishery products of a total value of $27,282,223, or 45 per cent. of the total for the Dominion.

As in recent years, British Columbia again led all the Provinces of Canada in the value of her fishery products. Her output for the year 1918 exceeded in value that of Nova Scotia by $12,139,157, and exceeded that of all the other Provinces combined by $9,456,968.

The following statement gives in the order of their rank the value of the fishery products of the Provinces for the year ending 1918:—

	1918.	Increase or Decrease compared with 1917. (Inc. +; Dec. —.)
British Columbia	$27,282,223	+$5,763,628
Nova Scotia	15,143,066	+ 674,747
New Brunswick	6,298,990	+ 155,902
Quebec	4,568,773	+ 1,154,395
Ontario	3,175,111	+ 308,692
Manitoba	1,830,435	+ 287,147
Prince Edward Island	1,148,201	— 638,109
Saskatchewan	447,012	+ 126,774
Alberta	318,913	+ 134,904
Yukon	37,820	— 29,580
Totals	$60,250,544	$7,938,500

The Species and Value of Fish caught in British Columbia.

The total value of each species of fish taken in British Columbia for the year ending December 31st, 1918, is given in the following statement:—

Salmon	$17,207,245 00
Halibut	5,196,539 00
Herring	1,742,757 00
Whales	1,382,278 00
Cod	426,239 00
Pilchards	413,853 00
Black cod	285,034 00
Flounders	145,385 00
Soles	92,471 00
Crabs	54,660 00
Clams and quahaugs	48,200 00
Red cod, etc.	43,422 00
Grayfish	29,607 00
Oysters	26,926 00
Smelt	26,075 00
Shrimps	23,930 00
Skate	16,565 00
Perch	11,252 00
Oolachans	8,476 00
Trout	5,025 00
Carried forward	$27,185,059 00

* The data used here are derived from the Dominion Bureau of Statistics, 1918.

THE SPECIES AND VALUE OF FISH CAUGHT IN BRITISH COLUMBIA—*Continued.*

Brought forward	$27,185,059 00
Fur-seals	3,320 00
Hake and cusk	3,097 00
Shad	2,700 00
Octopus	2,321 00
Sturgeon	1,690 00
Whiting	1,451 00
Bass	249 00
Mixed fish (not including any kinds mentioned elsewhere)	168 00
Eels	72 00
Tomcod	18 00
Fish-oil	53,380 00
Fish-offal	9,775 00
Scrap and fertilizer	8,423 00
Guano	10,500 00
Total	$27,282,223 00

THE SALMON-PACK OF 1919.

The salmon-pack in the Province for the year 1919 totalled 1,393,156 cases. It was 223,000 cases less than in the record year 1918. The catch of sockeye in all the waters of the Province totalled 369,445 cases, as against 276,459 cases in 1918 and 330,209 cases in 1917. The catch of red, white, and pink spring salmon totalled 100,551 cases, as against 107,354 cases in 1918 and 76,276 cases in 1917. The pack of pink salmon totalled 346,639 cases, as against 527,745 cases in 1918 and 486,759 in 1917. The pack of chum salmon totalled 372,035 cases, as against 497,615 cases in 1918 and 476,273 cases in 1917.

THE 1919 SALMON-PACK BY DISTRICTS.

The Fraser River.—The total pack of all grades of salmon in the Fraser River District in British Columbia waters in 1919 totalled but 163,123 cases, as against 210,851 cases in 1918, 402,538 cases in 1917, 127,472 cases in 1916, 320,519 cases in 1915, and 349,294 cases in 1914. The catch of sockeye totalled but 34,068 cases, or 38½ per cent. less than that of its brood-year, 1915.

The season's pack of sockeye in the State of Washington waters of the Fraser River District in 1919 totalled 64,346 cases, as against 87,465 cases in the previous fourth year, 1915.

The pack of sockeye in the entire Fraser River system in 1919 totalled only 98,414 cases, as against 178,595 cases in 1915, the brood-year of the 1919 run, a decline for that cycle of over 50 per cent., and an additional demonstration that the runs of sockeye to the Fraser River system are "perilously near extermination."

The Salmon-catch of Northern Waters.

The Skeena River.—The salmon-pack on the Skeena River in 1919 totalled 398,877 cases, or 24,561 cases more than the record pack on that river made in 1918. The principal gain was in the pack of sockeye, the catch for the year being 184,945 cases, the largest pack of sockeye ever made on that river, with the exception of the record pack of 187,246 cases made in 1910. The run of sockeye to the Skeena this year is to be attributed to the hatches of 1914 and 1915, because it has been demonstrated that the runs to that river consist of both four- and five-year-old fish. The sockeye-catch in 1914 consisted of 136,166 cases and that of 1915 of 116,533 cases, the catch in both of those years being well over the average for that river. It is to be noted that the reports from the spawning area of the Skeena in both these years indicated abundant spawning. It has long been recognized that the nature of the fishing-grounds of the Skeena, due to numerous reefs of rock and snags, affords the fish entering the river a greater natural protection than is afforded the fish running to any other stream in the Province. The catch of springs and chums on the Skeena shows slight increases over 1918. The catch of pinks shows a decrease.

Rivers Inlet.—The catch of salmon on Rivers Inlet totalled 80,367 cases, the smallest made there since 1913. The run of sockeye there this year, as usual, consisted of both four- and five-year-old fish; hence it is to be credited to the spawning of the years 1914 and 1915. As in both

of the latter years the catch was well above the average for the inlet and the reports from the spawning-grounds indicated abundant spawning, the catch of sockeye at the inlet this year was most disappointing. Weather conditions were favourable to good catches. Some close observers at the inlet state that the fish were so much smaller than usual that they were enabled to pass through the meshes of the nets, and that large numbers did so. Fishery Overseer A. W. Stone, who has inspected the spawning-grounds of Owikeno Lake at the head of the inlet annually for the past eight years, reports that in point of numbers the sockeye found there this year equalled the average of good-year runs, but that in all sections the fish were smaller in size than usual.

The Nass River.—The salmon-catch in the Nass River District totalled 97,512 cases. It was the smallest catch since 1914. The catch of sockeye produced a pack of 28,295, and, though some thousands larger than in the two preceding seasons, it shows a decline from that made in 1914 and in 1915. The catch in 1914 totalled 31,327 cases and in 1915 39,349 cases. The operation of salmon-traps on the islands in American waters at the entrance of Portland Canal and Observatory Inlet, through which the sockeye seeking the Nass River must pass, apparently is a drain on the Nass sockeye run. The establishment of the traps has created conditions there somewhat similar to those on the Fraser River system which destroyed the sockeye run to the latter river. Hereafter their drain on the run of sockeye to the Nass River must be given full consideration.

The Vancouver Island Section.

The pack of salmon from Vancouver Island waters, with the exception of the sockeye salmon taken in the traps in Juan de Fuca Strait that are credited to the Fraser pack, since they are known to be running to that river, totalled 272,114 cases, as against 389,815 cases in 1918 and 325,723 in 1917. Previous to the latter year the salmon-catch from Vancouver Island waters was not shown separately, but included in the catch credited to outlying districts. The 1919 return shows a remarkable decline from that of the two previous years in the catch of chums. In 1917 the pack of chums totalled 240,381 cases and that of 1918 a total of 251,266 cases, while 1919 catch gave a pack of but 128,368 cases. The pack of pinks in 1919 was 14,080 cases less than in 1918 and 112,368 cases less than in 1917. The catch of springs in 1919 shows a material gain over both 1918 and 1917. Owing to unusually rough seas off the west coast of the Island in 1919, the fleet of trolling-boats engaged in salmon-fishing was unable to operate in the open sea as much of the season as in the two previous years. In consequence their catch was smaller.

Reports form the Salmon-spawning Areas of the Province in 1919.

As usual, the Department conducted investigations of the spawning area of the Fraser, Nass, and Skeena Rivers and Rivers and Smith Inlets. The detailed reports of the officers who conducted the investigation are reproduced in the Appendix to this report.

The Fraser River.—The spawning-grounds of the Fraser River basin were again inspected by John P. Babcock, Assistant to the Commissioner. He was assisted by Inspector of Fisheries C. P. Hickman and Fishery Overseer Wm. Newcombe, who returned from France in time to again take up the work. In the report made by Mr. Babcock it is shown that the number of salmon that reached Hell's Gate Canyon, above Yale, was very much smaller than in any year since annual inspections were inaugurated in 1901, and that in consequence there were less salmon on all the spawning-beds north of that canyon, which includes the major portion of that vast river-basin, than in any former year.

In order to obtain data as to the number of sockeye that reached the Thompson and Quesnel Rivers, the Department attempted to catch sockeye in both those streams by means of anchored gill-nets. Two nets were maintained in the Thompson near Spences Bridge from August 18th to August 29th. The number of salmon taken by the nets totalled but six, all of which were males. The officers in charge of the nets kept a close watch at the rapids of the river both below and above the nets, and record that they saw no salmon except three taken by Indians and those secured by the set-nets. The nets were operated during the time that in former years the run was at its height. A month later Officers Hickman and Newcombe, acting separately and on different dates, inspected the waters of Shuswap and Adams Lakes and found no evidence of sockeye having reached there, and but few were noted by others at later dates.

The record on the Quesnel River discloses a condition as disastrous in its results as that on the Thompson. Not a single sockeye was taken in the gill-net set in the Quesnel River from

August 28th to September 9th. Following the practice begun by the Department in 1903, a watchman was placed on the dam at the outlet of Quesnel Lake, who acted throughout the past season. He reports that but three sockeye, two males and one female, were seen in the clear waters of the Quesnel River below the fishway and the dam at the outlet of the lake. Former reports issued by the Department record that over 4,000,000 sockeye entered Quesnel Lake through the fishway during the fall of 1909, and that some 557,000 sockeye entered that lake in the fall of 1913. This year, as stated, but three sockeye were seen there during the entire season. More conclusive evidence could not be produced to establish the practical extermination of the runs of sockeye to the Fraser than is presented by these records from two of its largest tributaries.

There was a larger run of sockeye to the Birkenhead River, at the head of the Harrison-Lillooet Lakes watershed, this year than in any recent year. The run there was so much larger than even in 1915 that Mr. Babcock concludes that it cannot altogether be attributed to the fact that the Indians were not permitted to fish at the Little Portage at the foot of Lillooet. The collection this year of 30,000,000 sockeye-eggs at the Pemberton Hatchery conclusively proves that the run was unusually large. The collection of eggs in 1918 totalled 11,960,000; in 1917, 5,270,000; in 1916, 25,750,000; and in 1915, 25,250,000. The collection this year exceeded that made in the brood-year of this season's run (1915) by 5,000,000. Mr. Babcock is convinced that the run to the Birkenhead River this year was due to the successful operations of the hatchery in 1915.

The run of sockeye to Harrison Lake and to the lower section of the Fraser River this year was larger than in any year since 1915. Mr. Babcock also attributes this run to the successful operation of the hatcheries.

The Situation in the Fraser River at Hell's Gate Canyon, above Yale.

Mr. Babcock in his report has this to say of conditions in the Fraser River at Hell's Gate Canyon, above Yale:—

"Considerable concern has again been exhibited by those interested in conditions existing on the Fraser River at Hell's Gate Canyon. The statement made that the river-channel there is still so blocked as to prevent the passage of sockeye to the waters above, and that the sockeye that reached there this year did not get through the canyon, is untrue. The rocks that blocked the channel in 1913 were entirely removed in 1914-15 and the old channel fully restored. All the sockeye that reached there this year passed through the canyon without more delay than often occurred in the years before the slide of 1913. Conditions at Hell's Gate since 1914 have been and are now as favourable to the passage of all species of salmon as they were previous to the slides of 1913 and 1914. The Department has had the channel there under close observation every season since 1901. The rapids at Hell's Gate are the first real obstacle which the sockeye encounter in their ascent of the Fraser River. Until they reach there they have had no rapids of importance to overcome, and consequently are inexperienced in passing through such swift and broken currents. The result is that even at the most favourable stages of water they make repeated attempts before they succeed in finding their way through the Gate. This year, as in the years before the slide of 1913, there were short periods, in certain unfavourable stages of water, during which few (if any) salmon passed. On two occasions this season the run was delayed for several days, but all the salmon eventually succeeded in passing, so that the delay was not of material importance. The rapids at Hell's Gate are not more difficult of ascent at times than the rapids in the Fraser above the mouth of Bridge River, and are not nearly as difficult at all times as the rapids and falls at 'the Hole' on the Chilko River, some miles above the mouth of the Whitewater River, yet the sockeye on reaching those places experience less delay than at Hell's Gate. At Hell's Gate and at the Bridge River Canyon all the sockeye apparently make the ascent close to the surface on either bank, and the same is true at Fish Canyon on the Chilcotin River, but at 'the Hole' on the Chilko all apparently hug the rocks on the bed of the stream and none of them pass close to the surface. After viewing a run at Hell's Gate and then observing the sockeye at Fish Canyon on the Chilcotin River one cannot help being impressed by the certainty with which they attack and overcome the last-mentioned rapids. They show much more expertness in overcoming rapids and falls by the time they reach the latter rapids. From studying the conditions at Hell's Gate since 1901 I am of the opinion that the situation there does not offer a serious obstacle to the ascent of sockeye."

Spawning-grounds of the Northern Section of the Province.

Rivers Inlet.—Fishery Overseer A. W. Stone again inspected the spawning-beds of the Rivers Inlet sockeye run this year. It was his eighth consecutive annual inspection. This report shows that the spawning-beds were as abundantly seeded as in 1914 and more abundantly seeded than in 1915, the brood-years of this year's run to Rivers Inlet. The catch of sockeye at Rivers Inlet has already been shown to have been far below the average of the past ten years. The poor catch Mr. Stone attributes to the unusually small size of the fish that ran this year. He found that the size of the fish on all the spawning-beds was much less than in former years, and because he found the numbers on the beds as numerous as in the brood-years he concludes that the run to the inlet this year was an average one, and that, in consequence of the beds having been so abundantly seeded, the hatch of the 1919 spawning will produce an average run in the years of their return at maturity.

Smith Inlet.—Fishery Officer A. W. Stone also inspected the spawning-beds of the Smith Inlet sockeye run. He found the beds as abundantly covered by spawning sockeye as in any one of the last six years that he has inspected them. The number there this past season compared favourably with the year 1914, when the numbers on the beds were greater than usual. Referring to conditions on the fishing and spawning-beds at Smith Inlet this year, Mr. Stone says:—

"The comparatively small pack of sockeye salmon at the two canneries at Smith Inlet this year, amounting approximately to 16,000 cases, and contrasting it with the big pack of 38,000 cases in 1914 and 35,000 cases in 1915, calls for some explanation as to why more fish were not caught on the fishing-grounds this year, since the spawning-beds are shown to have been so abundantly seeded. The poor catch this season was due to the fact that some of the gill-net fishermen forcibly restrained the operations of the drag-seines in Qualla Creek, the entrance to their spawning-grounds. I am reliably informed that during the four or five days the seines were not in use a vast number of sockeye passed through the creek, all of which reached the spawning-beds."

Because he found the spawning-beds of Smith Inlet were so abundantly seeded this year, Mr. Stone anticipates a large number in that inlet in 1923.

Nass River.—An inspection of the spawning-beds of the Nass River was jointly made by Inspector of Fisheries C. P. Hickman and Dominion Fishery Overseer J. Maxwell Collison. They visited the Meziadin Lake section and the tributaries in the vicinity of Ayansh. They found very few sockeye in Meziadin Lake or River or on the main spawning tributaries of the lake. In all that section there were many less sockeye than had previously been found there. They found very few sockeye in any of the tributaries of the Nass near Ayansh, but were told by the Indians that the early run had been up to the average of recent years. Summarizing the results of their inspection, Messrs. Hickman and Collison say:—

"We wish to call attention to the very few sockeye on the Meziadin spawning-beds this year. It is apparent that something very vital has happened to the sockeye of the Nass because of such a shortage. As the pack at the canneries at the mouth of the Nass this season was only an average pack, plenty of sockeye should have reached the spawning-grounds had there been an average-sized run. The only explanation that we can give for such a shortage is the operation of traps in South-eastern Alaska, there having been fourteen or more traps in operation between Cape Fox and Tongas Islands. What number of Nass sockeye were taken in those traps we are unable to say, but from reliable information we believe they intercepted Nass River sockeye."

The Inspectors found that the lower end of the fishway at Meziadin Falls had been seriously damaged by high water; the lower end of the natural rock wall between the river's channel and the channel of the fishway having been partly carried away, and the upper end shows signs of giving way. The crib-work that guarded the upper end of the fishway had also been washed out. The channel of the fishway was, however, but slightly interfered with and still afforded a free passage for the fish that reached there. There is urgent need of taking additional steps to prevent further damage to the outer wall and also to the crib-work on the land side of the fishway, several of the supports that sustain the crib-work and that rested on the rock wall opposite having been carried away, and the others need attention. Chief Inspector of Fisheries Lieut.-Colonel F. H. Cunningham has advised the Commissioner that steps will be taken to place the fishway in working-order for the 1920 run of salmon, and that permanent repairs will be made as soon as the trail leading from Stewart to Meziadin Lake permits of getting in cement.

Skeena River.—Fishery Overseer W. A. Wisley inspected the principal area of the spawning-beds of the Skeena River in September. He reports all the beds as being well covered. The run to all sections is believed to have been as great as in any former year. The Babine Hatchery was filled with sockeye and some 6,000,000 eggs were taken and shipped to the Stuart Lake Hatchery, a tributary of the Fraser River. Mr. Wisley was advised that in July last vast numbers of yearling seaward migrants of sockeye passed out of Babine Lake. Adult sockeye entered Lakelse Lake this year as early as June 3rd to 9th, proving that an early run of sockeye entered the Skeena River before the fishing season commenced.

THE HALIBUT-FISHERY.

The halibut-catch landed at Provincial ports during 1919 totalled 19,198,565 lb., as against 16,697,000 lb. in 1918. Prince Rupert again leads in the landing, with a total of 16,476,270 lb. to Vancouver's 2,722,395 lb.

As a result of the investigations and deliberations of the American-Canadian Fisheries Conference of 1918, a treaty has been signed by the high contracting parties and is now before the United States Senate awaiting action. Its important provisions include a closed season on halibut-fishing by Canadian and American vessels from November 16th to February 15th and reciprocal port privileges. The effect of such a closed season as that suggested is doubtful in the judgment of William F. Thompson, the expert employed by this Department to investigate the halibut-fishery and who in his report published in 1916 has this to say on the subject:—

Close Season.

"Recognizing the urgency of the situation, there has been, among fishermen and dealers, a strong sentiment in favour of the imposition of a close season of two months, December and January. This has been perhaps the most widely approved measure of any proposed, and in view of the widespread adoption of closed seasons in conserving other species is worthy of careful consideration.

"To be worthy of adoption, however, it is imperative that a measure be shown capable of conserving the numbers of the species as a whole or in threatened areas, or adequate to increase the number of spawning fish where it has fallen below the margin of safety. The question in any case is simply one of ensuring the existence of a sufficient number of breeding males and females in those large areas now lacking them.

"It is a serious question whether the closed season would not simply result in a more intense fishery during the open portions of the year. It must be remembered that the cold-storage facilities now available render it possible to deliver a supply of halibut all the year round, with or without a close season. There is no question, then, of an interruption of the demand from the consumer, with a consequent lessening of the total called for; and there is, as we shall see, every reason to believe that this demand will be satisfied, whether there is a close season or not.

"The cost of catching is but a small part of the cost of transporting, preserving, and marketing. It could increase manifold before being felt greatly. If the fish may be purchased on the docks in Seattle at 5 cents per pound, as has been done, and sold by the retailers at 25 cents, then an increase of 2½ cents, or 50 per cent. of the original cost, would be but 10 per cent. of the retail price. Something essentially similar to this has taken place in the fishery, the length of a voyage, and with that the expense of obtaining a cargo, having increased by about 100 per cent. in the ten years between 1904 and 1914. That means that the yield per vessel has fallen to a half, yet the total catch landed by the fleet has steadily increased in response to the demand. Such being the case, it is hardly to be expected that the reduction of the fishing-time by a sixth would have much effect even if it were capable of being accepted at its face value.

"The apparent value of the close season during the winter is greatly modified by certain considerations. One of the most prominent of these is the fact that during the two months of December and January the catch is but half that prevailing during the summer months, as is shown on the chart. That is, the effectiveness of such a close season would be half that of a similar one in the summer. Furthermore, the decrease in total catch is in accordance with the diminished catch per unit of gear, and indicates with it the fact that the two proposed months are the most expensive. Providing the far greater consideration of the future of the banks were not in question, there would be no possible objection to legislating away the unprofitable part

of a business year. But, aside from the fact that it is not the *bona-fide* object of the proposed legislation to increase the immediate prosperity of the industry, it can be shown to have a really detrimental effect on the condition of the banks. The proposed close season would surely put vessels on a better financial basis, encouraging the building of more and rendering them capable of profitable operation on smaller summer catches than is now the case. This would mean the enlargement of the fleet and the closer fishing of the banks, including those considered the least profitable.

"Fishing on these more depleted southern banks off the coast of British Columbia is prevalent mostly in summer, because the catch per unit of gear is at that time highest, and the reliance is on young fish almost entirely. It has been shown that it is these banks which need protection, and if they are to have it, it must come while fishing is being done on them. Instead of that, as has been pointed out above, a winter close season will intensify the fishery, the more so as the most depleted banks are nearer to market than the less depleted.

"Cold-storage plants play an important part in intensifying this result of the closure. They not merely maintain the demand, but tend to counteract the extensive natural increase in price in winter and the decrease during the summer. This results from the absorption of surplus fish in summer for freezing and its sale during seasons of scarcity. There is in the winter, nevertheless, a considerable catch of fresh fish with which the frozen product must compete. The elimination of this catch during several months would without the cold-storage plants apparently stop the consumption, but with them could simply force the laying-by of more extensive stocks of fish frozen during the summer. It is obvious that this has a tendency to impel still better prices in summer and poorer in winter. In other words, there would ensue a more profitable summer fishery, hence a more intensive one. It should be observed in this connection that the near-by banks off the coast of British Columbia yield a medium of small-sized immature fish ('chicken halibut') very suitable for freezing. These banks are those fished most intensely in summer and need better, not poorer, protection. A certain measure of the harm might, it is evident, be averted by forbidding the sale of cold-storage halibut during the close season.

"The most generally held reason for supporting a winter close season is that it is designed to protect the halibut during its spawning period. The assumption is that the fleet resorts to 'spawning-grounds' on which are to be found spawning fish congregated from other localities, and that the catch consists to an unusual degree of such fish. However reasonable this may sound, it is impossible to find any basis of scientific fact behind it. On the contrary, so-called spawning-banks are those less depleted than others because less accessible, or because it pays to resort to them only during the winter seasons. It has been demonstrated that at one time the banks now characterized by small immature fish had a population of large, undoubtedly mature, fish, and that their absence is due to the effects of commercial fishing. We therefore come to the anomalous conclusion that protection is proposed for banks which show exhaustion least, as they have a more nearly adequate supply of breeding fish.

"If, however, the claim had been that within the confines of each bank winter fishing was carried on in areas characterized by spawning fish, more weight might be given it. As a matter of fact, however, no proof of such congregation has been found, and observation has not yet disclosed any annual change in average size in one portion of a bank which did not take place in another. The shift in the fishing-grounds, according to season, is something entirely different from this, being a removal of the fleet to other banks far distant. It is a fact worthy of every emphasis that no such extensive movement on the part of the fish is to be found, whether there is some possibility of a limited and local movement or not.

"It would seem certain that the closure would not protect spawning fish especially, and there would be little utility in extending protection to halibut spawning and immature alike at the cost of more intensive fishing during other seasons. As has been indicated, the depleted banks are characterized by a lack of mature fish and a predominance of immature. If the latter are caught, it is a matter of indifference at which season it is done, as all succeeding spawning periods are eliminated, anyway. This is also true of the mature halibut. There is no reason why capture a week before spawning-time should be more disastrous than capture six months previously, all the remaining periods of spawning being eliminated, anyway. If the number of fish caught by the fleet remains the same, prohibition of fishing during such a season would mean naturally that of those fish usually caught during spawning the more intense fishery would cause just as many to be captured before the season as would be caught later because of the protection.

As a result the number of fish present each spawning-time would be unaltered. As a matter of fact, the areas now needing protection are those in which halibut rarely have a chance to reach maturity, and to allow them to do so the only method available is to give them a better chance of escaping capture. It is not sufficient merely to alter the time of year at which they are caught.

"Among other reasons advanced is one implying that fish caught during winter are of poorer quality, with larger heads and leaner bodies, than those taken during summer. Regarding this it should suffice to state that the observed difference is due rather to the fact that in summer immature fish from banks with rapidly growing fish are utilized, while in winter mature slow-growing fish are obtained. These mature poor-quality fish come from undepleted northern, or outside, banks naturally characterized by large-headed fish, and it is extremely improbable that they change their appearance greatly with the season. It is just as well that these fish are utilized to some extent at least. The difference between banks in so far as quality is concerned is far greater than can be assigned to seasonal differences. It is not to be denied that there is such a seasonal difference, but it cannot be assigned the importance given it. This is the more true as it has no immediate bearing on the all-important objective of preservation of the banks."

An Extension of the Close Season.

Mr. Thompson states: "Despite the fact that there are cogent reasons against the adoption of a close season during two winter months, it is possible that certain modifications of it might be feasible; for instance, an extension to four months. But if not disastrous to the fishery and to the fishermen because of its length, the objection previously held that the already depleted banks would be subject to a still greater strain would apply to an even greater degree. The restraint on the fishery would be accomplished principally, perhaps, by forcing vessels and men to lose a third of their time. It is possible that some other fishery could be developed to supplement that for the halibut during that season, but at present none offers itself; and even if such were the case, the objection to the changed concentration of the fishery still remains. So it is hardly conceivable that such a measure could meet with unqualified approval.

A Summer Close Season.

"A course, on the other hand, which might obviate the most dangerous features of the close season would be to place it in the summer. One summer month would be the equivalent of two winter months. Such action would result in discouraging the capture of small immature fish, of which spring and summer catches mainly consist on the older banks, and would encourage winter fishing. The influence of cold-storage firms would not in such a case be adverse. But the serious question would still remain as to whether the total catch from any bank would be sufficiently decreased. If the demand overcame the handicap of an increase of the voyage length of 200 per cent. within ten years, would it not overcome one of a decrease in available fishing-time of even 30 per cent.? Although it is probable that what the banks need is a total cessation of fishing in view of the great rate of depletion, yet such a measure as closure during summer months would be certainly effective in its nature, in contrast to the winter close season."

In lieu of a winter closed season for halibut-fishing, Mr. Thompson suggests that one for all waters should be provided, and states:—

"I. The banks should be divided into districts of such areas as: (1) Those off the Oregon and outer Washington coasts; (2) the coast of British Columbia; (3) between Icy Strait and Dixon Entrance; (4) between Icy Strait and Cape Cleare; (5) between Cape Cleare and the entrance to Bering Sea; (6) any subsequently discovered banks not properly attached to the foregoing, including Bering Sea.

"Areas 1, 5, and 6 are those least depleted; Area 2 has been shown to be badly exhausted. Areas 3 and 4 are presumably also depleted, the latter less so.

"II. Areas 2 and 3 could be alternately closed and opened, 2 closed for five years, then 3 for the next five, and so on alternately. Areas 1, 4, 5, and 6 could be closed at the same time as either 2 or 3, their closure being subject to the discretion of conferees appointed by the two Governments; provided that, unless otherwise agreed upon by these conferees, Areas 1, 3, and 5 would be closed together, and Areas 2, 4, and 6. Each area would thus be closed five out of every ten years.

"This arrangement would allow sufficient latitude of time to overcome any differences in the productive power of the areas, and at the same time make the closures automatic if the times of their inauguration were not agreed upon. It would also obviate any danger of placing any particular port under a disadvantage.

"III. To cover the period of adjustment and to render protection immediately available to the most badly depleted regions, a special programme for the first ten years might be formulated. Thus Area 2 could be closed for five years, its opening to be simultaneous with the closure of Areas 4 and 3. Subsequent to the first ten years, the provisions of section II. could apply. This programme would be felt very slightly during the first five years, more in the second, and fully in the third, allowing in the meantime the exploitation of the least-depleted banks and protecting those in the worst condition. It would be advisable to close Area 2 for more than the five years during this first decade.

"IV. There should be an emergency clause enabling a further closure of any area upon mutual consent of the conferees, a closure solely in addition to the prescribed minimum.

"V. Provision could be made for the collection by each Government of data from the official log-books of the fishing-vessels, it being made compulsory for the masters of such vessels to supply in these books, over their signatures, the following information:—

"(*a.*) Place and date of each fishing operation.

"(*b.*) Amount of gear utilized and its nature (size of net, or space between hooks on long line.)

"(*c.*) Number and approximate dressed weight of halibut taken in each place. This should be collected by each Government and placed at the disposal of the other at the conclusion of each year, it being expressly stipulated that such data be placed in the hands of the scientific departments of both Governments, and that it be formulated by them, and in a way mutually agreed upon by the conferees. This should be the case in order that the latter could utilize the information obtained in making their decisions regarding the times of closure.

"The discretionary power vested in the officers designated as conferees should lead the fishermen to furnish this information willingly, in the interests of their trade.

"It appears to the writer that the principal objection which will arise will be one of inadequate amount of protection, but it is difficult to see how any other precaution than the granting of discretionary powers to the appointed officials could be taken. The objection is one which would apply to any measure.

"There may be some injury worked to vessels unable to fish outside the three-mile limit, or those with limited cruising radius. This might be greatly magnified by opponents of the measure, but does not seem important in looking over the list of vessels. It must follow on the exhaustion of the banks in any case, or on the imposition of any other regulation."

The Salmon-fishing Regulations of the Province.

In December the Commissioner submitted a memorandum to the Hon. C. C. Ballantyne, Minister of Naval Service, having in charge the Dominion Fishery Service, setting forth his views as to the salmon-fishing regulations of the Province. After reviewing the history of the salmon-fisheries of the Province and the reports of the many Royal Commissions that have investigated their conditions, the Commissioner suggested "that the time has come for a complete and radical change in the policy of handling our fisheries." "It is time," he stated, "that the Government stepped in to seriously protect the fish, eliminate all useless competition, overequipment, and waste, to the end that the people may be able to obtain at a fair price one of the natural food products of the Province. To permit of utter depletion of the salmon-fisheries of the Province would be a 'policy which could only be characterized as a criminal policy.' The fish of the Province, notwithstanding the depletion of both the salmon and the halibut, are still one of its greatest food assets. With judicious handling the fisheries can be maintained for all time. The depleted fisheries can be built up, but they cannot be maintained if the present methods are to continue. The Fraser River fishery demonstrates what will happen if things are to go on as they have been going. We have overdone the thing. We have drawn, and are drawing, too heavily upon our supply of salmon and halibut. What we need is a complete and radical change of policy, a departure altogether different from past and existing methods. . . . Instead of licensing existing and new companies and individuals to take and handle our salmon-fisheries the Government should take them over and handle them. By so doing the fish will be given full

protection. There will be a radical reduction in equipment and consequent reduction in overhead expenses that will materially reduce the retail price of both fresh and canned salmon. The Governments of Great Britain and the United States took over the fur-seal industry because it was essential to the preservation of the fur-seal. Corporate and individual enterprise was killing them off. The Governments took them over and adopted a policy that has materially increased the numbers in the herds of fur-seals."

The Commissioner suggests that the Government should assume the sole control of the entire salmon industry and manage it in the interest of the people of Canada. "The policy proposed," he states, "is a practical and sane business thing for the Government to undertake. It is a business that will pay dividends in a greater supply of fish, and at a cheaper price, not only to the people of to-day, but to our people that are to come after. Government control and operation is, in my opinion, the solution of this great economic question."

The Commissioner's memorandum will be found in the Appendix of this report.

CONTRIBUTION TO THE LIFE-HISTORY OF THE SOCKEYE SALMON.

Dr. Gilbert's sixth contribution to the reports of the Department on the life-history of the sockeye salmon, which is issued herewith, contains an analysis of the sockeye runs to the principal waters of the Province for the year 1919. We now have a complete history of the runs for eight years, and in consequence are enabled to make comparisons that are of economic value.

The outstanding feature of the examination of the scales collected from the 1919 run of sockeye to the Fraser was the remarkable series that passed in procession during the season. Sockeye having a defined type of scale-structure made its appearance on a given date, would occupy the stage for a time to the practical exclusion of any other type, and then, on another date, would suddenly be supplanted by another type of structure, which was so sharply distinguished from the first that it could not conceivably be found in company with it on any spawning-ground. The run in 1919 was peculiar in comparison with previous years in the distinctness of these components of the run. Apparently fewer types were represented than has been the case in other seasons, or if represented, then by fewer individuals, which could not confuse the characteristics of the race which was dominant in that part of the run. Whereas during other seasons it has been a rare occurrence to find in any period of the run a race unmixed with any other and appearing homogeneous, the impression during 1919 was a succession of such occurrences, in each of which one race strongly predominated, even if not wholly without mixture. Apparent paucity of races can only find explanation in the practical extermination of the run to certain tributaries, which even in the depleted condition of the river during the last decade have until now furnished their quota. Not only did the migration waves exhibit each its characteristic structural peculiarities, it possessed also its own distinctive proportionate representation of age-groups. The succession of racial forms which appeared in the main run, either in the sea approaches to the river or in the main channel of the latter, are most readily detected by characteristics shown in the central or nuclear area of the scales. It is this area which records the growth of fry and fingerlings in fresh water—a growth which takes place in a number of lakes scattered widely through the river-basin, varying extensively in their climatic conditions and in the character and amount of food which they offer. The growth in these lakes differs materially, and the size of the yearlings, when they migrate seawards in the early spring, is an index of the favourable or unfavourable conditions under which the different lots have been nourished. The fingerling groups of smaller size will have at migration smaller scales, and these will be marked by fewer rings. In the adult salmon, therefore, the size of the nuclear area, which represents the entire scale of the fingerling migrant, and the number of rings which this nuclear area contains, serves as a measure of the size of the fingerlings, and thus enables us to sort out the races which have differed in amount of growth during the first year. Not all races may have differed in this respect. But they frequently do so, and where this is the case an examination of the nuclear area gives data of high value.

One fact which emerges clearly from the tables giving the lengths and weights contained in the paper is the small size of the sockeye of each group of the 1919 run as compared with previous years. The run of 1919 produced the smallest sockeye of which we have any record on the Fraser.

In his analysis of the data collected at Rivers Inlet during the run of 1919, Dr. Gilbert finds that the present conditions there are fast developing into one of pronounced danger. He shows that the productivity of the river has fallen during the past four years to little more than half its previous magnitude, and that we are no longer justified in classing the recent poor years with those occasional fluctuations which occurred in previous cycles.

For comparison the history of the Rivers Inlet sockeye-catch is divided into successive four-year periods, as follows:—

1904-1907, average pack of 98,589 cases.
1908-1911, „ „ 99,142 „
1912-1915, „ „ 98,717 „
1916-1919, „ „ 53,948 „

In commenting on general conditions at Rivers Inlet, Dr. Gilbert states: "Unless the intensity of the fishing is at once diminished, unless we decrease the total number of sockeye taken annually from this watershed, we are in danger of repeating there on a smaller scale the tragic history of the Fraser River."

The eight years of study of the sockeye runs to Rivers Inlet show that the average size of the sockeye within their own group was so nearly constant during the first years of the investigations that any considerable change in this respect becomes immediately apparent. Such a change undoubtedly occurred in the runs of the last three years. There is no present reason to allege in support of an assumption that there is a casual connection between the size of the individual fish and the magnitude of the run. The coincidence during the last three years may be only chance association. But against this hypothesis Dr. Gilbert states we have our observations of other exceptionally poor runs in the rivers of the Province during the years 1913 and 1917, when, as stated in the Department's report for 1917, "We have extremely poor packs of sockeye in all the large rivers of the Province, and we have these poor runs consisting everywhere of undersized fish."

At present there is no explanation for the extensive annual fluctuation in the size of the runs in our northern salmon-streams. Neither the Nass, the Skeena, nor in Rivers Inlet has it been established that there was any relation between the size of the run in any given year and the size of the broods from which it has been derived. How can this lack of relation between the two be explained? Of course, it may be contended that the apparent lack of relation is due to incorrect estimates of the size of the runs during some or all of the seasons. Estimates have been made on the apparent abundance of the fish and the size of the commercial catches. Failure by this method, due to exceptional conditions, may indeed occur now and then. But quite generally it has been noted that seasons of good fishing correspond with successful seasons on the spawning-grounds, as these are established by direct observation. So, while we may admit occasional lapses of method, it must be agreed that years of apparent abundance are correctly so characterized and correspond with seasons in which the spawning-beds are abundantly seeded. As Dr. Gilbert submits, "the conclusion that the relative amount of seeding of the beds has comparatively little influence on the size of the resulting runs becomes palpably absurd if pressed to the limit. If the number of eggs deposited in the beds be sufficiently reduced, it must have a paramount influence on the magnitude of the run. When the variation in the annual production of eggs is of lesser amount, no greater than has occurred in the Nass, the Skeena, and on Rivers Inlet in the last ten years, there is the possibility that other factors which limit the production of salmon are of greater importance than egg production, within the limits of variation of the latter, and have a dominating influence in producing the annual fluctuation so evident even in streams that are not overfished. Where overfishing has occurred the case would be different. By overfishing we mean that so great a reduction of the spawning stock has been made that insufficient eggs are produced year by year to maintain the maximum of the run. In pronounced cases of overfishing a correlation is well established between egg production in a given year and the size of the resulting run. The relation has repeatedly been shown in the decline in the Fraser."

Dr. Gilbert concludes his discussions of this question as follows: "Obviously, the occurrence of undersized fish characterizing each of a series of conspicuously poor years does not exclude the possibility of overfishing as a contributory cause for the decreased runs. When the experience of a series of years indicates unmistakably that the productivity of a stream is declining to a lower level, the common-sense treatment of the situation is to modify favourably the only factor

over which we exercise control. We should increase the spawning reserve and thus seek to augment the egg production. Egg production must, after all, be fundamentally most important. As a constant factor, in the long run it will dominate the situation."

In dealing with the run of sockeye to the Skeena in 1919, Dr. Gilbert points out that "the catch of the year produced a pack of 184,945 cases, and was the next to the largest known in the history of the river. It was exceeded only by the take in 1910, which reached the total of 187,246 cases. The occurrence of two favourable seasons in succession, those of 1918 and 1919, bring a certain amount of needed reassurance concerning the general condition of the salmon-supply in the Skeena River. The previous occurrence of two extremely poor years in succession, 1916 and 1917, had occasion for grave forebodings, lest they might indicate that the salmon-supply of the river was being drawn on more heavily than in the long run would prove safe. This question has not yet received a conclusive answer. Annual fluctuations often conceal the sequence of events. Only by resorting to averages which cover periods of years can we ascertain with some degree of certainty whether the supply is on the whole diminishing. With this object in view, we have ascertained the average pack on the Skeena River in four-year cycles from 1903 until 1919:—

Average pack from	1903 to 1906	78,868	cases.
„ „	1907 to 1910	130,851	„
„ „	1911 to 1914	101,664	„
„ „	1915 to 1919	91,477	„

"Considering these averages in connection with the fact that the number of canneries and the amount of fishing-gear employed in this district have been relatively constant during the greater part of the period under consideration, and the further fact that latterly the increase in canneries and the high price obtained by the fishermen has encouraged them to make every effort, we cannot escape apprehension that we are slowly but certainly encroaching on our capital supply of fish. It would seem that, on the average, the productivity of the river is declining. Until this question has received a satisfactory decision the situation on the Skeena should receive most careful and conservative treatment. The intensity of the fishing should be diminished and not increased."

Dr. Gilbert's studies of the Nass River sockeye runs of the last eight years show that each run is very complex, but that it is a well-ordered complexity: "Different age-groups appear and develop in orderly sequence, and are marshalled as distinctly in assemblages with determinate numerical ratios as though they had schooled separately at sea and were returning each under migration laws peculiar to itself. Furthermore, the system pursued by the age-groups in 1919 is identical with that of former years . . . and testifies to the delicacy of the adjustments which govern so rigidly the migration behaviour of the different age-groups. Adjustments of this nature in other animals escape our observation, for we have ordinarily no means of grouping individuals in accordance with the important facts in their life-history. The categories themselves are unrecognized and unsuspected, and no possibility is presented of delving far beneath the surface. Formerly this condition obtained with the salmon also, for nothing in the external appearance, the size, or the structure makes it possible to distinguish one group from another. As they pass before our unaided eyes during the fishing season the impression is given of a homogeneous assemblage. Not until we learn to decipher their autobiographies as inserted on their own scales do we become aware of the play of forces and the responses, and aware of the diverse elements, each governed by its own laws, and each articulating perfectly with the main body of the run."

The following statement of the salmon-eggs placed in the hatcheries of the Province in 1919 is furnished by Lieut.-Colonel F. H. Cunningham, Chief Inspector of Fisheries for the Dominion:—

Statement showing Total Number of Eggs placed in Various Hatcheries in British Columbia, 1919.

Name of Hatchery.	Sockeye.	Cohoe.	Springs.	Pinks.	Chums.	Steelheads.	Atlantic Salmon.	Redfish.	Kamloops Trout.	Rainbow Trout.	Cut-throa Trout.
Anderson Lake	8,100,000										
Babine Lake	9,670,000										
Cowichan Lake		1,784,000	1,310,306			37,000					188,200
Cultus Lake	10,522,000				112,000						
Gerrard								1,100,000	1,402,600	10,000	
Harrison Lake	7,549,000	190,000	3,574,000	4,248,000	573,000						
Kennedy Lake	8,463,000	33,000									
New Westminster		230,000		*450,000		31,000	†360,000				32,000
Pitt Lake	3,868,500	265,000	28,000								
Pemberton	31,665,000										
Rivers Inlet	11,720,000										
Stuart Lake	7,400,000										
Totals	98,957,500	2,502,000	4,912,300	4,698,000	685,000	68,000	360,000	1,100,000	1,402,600	10,000	220,200

* Taken from Courtenay River, Vancouver Island. † Received from the East.

Note.—No eggs placed in Skeena River or Seton Lake Hatcheries, 1919.

THE SOCKEYE SALMON-PACK* OF THE FRASER RIVER DISTRICT FROM 1900 TO 1919, INCLUSIVE.

Year.	Fraser River.	Puget Sound.	Totals.
1900	229,800	228,704	458,504
1901	928,669	1,105,096	2,033,765
1902	293,477	339,556	633,033
1903	204,809	167,211	372,020
1904	72,688	123,419	196,107
1905	837,489	847,122	1,684,611
1906	183,007	182,241	365,248
1907	62,617	96,974	159,591
1908	74,574	155,218	229,792
1909	585,435	1,005,120	1,590,555
1910	150,432	234,437	384,869
1911	62,817	126,950	189,767
1912	123,879	183,896	307,775
1913	736,661	1,664,827	2,401,488
1914	198,183	336,251	534,434
1915	91,130	64,584	155,714
1916	32,146	78,476	130,622
1917	148,164	411,538	559,702
1918	19,697	50,723	70,420
1919	38,845	64,346	103,191

* Given in cases—forty-eight 1-lb. cans to case.

SOCKEYE EGG-TAKE AT FRASER RIVER HATCHERIES FROM 1901 TO 1919.

1901	15,741,000
1902	72,034,000
1903	13,464,000
1904	9,469,000
1905	97,656,000
1906	51,121,000
1907	53,952,000
1908	46,709,000
1909	98,000,000
1910	37,343,000
1911	22,937,000
1912	38,500,000
1913	86,000,000
1914	28,589,000
1915	68,476,000
1916	40,203,000
1917	31,004,000
1918	20,581,500
1919	61,004,500*

* 7,400,000 of these eggs were collected from the Skeena River and hatched at Stuart Lake.

APPENDICES.

THE SPAWNING-BEDS OF THE FRASER RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

Sir,—I have the honour to submit the following report of my annual inspection of the salmon-fishing and of the spawning area of the Fraser River District during 1919:—

The catch of all species of salmon from the Provincial waters of the Fraser River District this season produced a total pack of 163,123 cases, one of the smallest ever made. Of the thirty-seven canneries heretofore operated in the district, but twelve were operated this year. Their combined pack consisted of 34,068 cases of sockeye, 39,253 cases of pinks, 39,223 cases of springs, and 15,941 cases of steelheads. The catch of sockeye this season was 57,067 cases less than it was in its brood-year, 1915. The catch of pinks in Provincial waters was close to 100,000 cases less than the catch of 1917, the brood-year of this season's run.

The catch of both sockeye and pinks in the State of Washington waters of the Fraser District was equally unsatisfactory and unproductive. The pack of sockeye totalled but 64,346 cases, as against 87,456 cases in 1915, the brood-year, and the pack of pinks totalled but 421,215 cases, as against 1,124,884 cases in the brood-year 1917.

The total pack of sockeye in the Fraser River District this year was but 98,414 cases, as against 144,532 cases in 1915, and the total pack of pinks was but 460,468 cases, as against 1,256,326 cases in 1917. The fact that the prices paid this year for both sockeye and pinks were considerably higher than in any former year, and the further fact that the amount of gear used was as great as in 1917, leads inevitably to the conclusion that the small catches in the district were due to the small run.

During the season I personally inspected the principal spawning area of the Fraser River basin. It was my eighteenth annual inspection. I was again assisted by Inspector of Fisheries C. P. Hickman and Fishery Officer W. A. Newcombe, the latter having returned from France in May. The result of our inspection conclusively shows that there were even less sockeye on the spawning-beds of the Fraser River than in any former year, notwithstanding the fact that a greater number of sockeye reached the waters at the head of Lillooet Lake than for many years.

The number of sockeye that reached Hell's Gate Canyon, above Yale, was very much smaller than in any year since annual inspections were inaugurated in 1901; consequently there were less sockeye on all the spawning-beds north of that canyon, which includes the entire upper section of that river-basin, than in any previous year.

The Dominion Government issued an order in July prohibiting the Indians from fishing for sockeye above the commercial fishing boundary at Mission Bridge. Heretofore the Indians have been permitted to fish for their own needs at any point they desired. They had conducted extensive operations at Hell's Gate, at Bridge River Canyon above the village of Lillooet, and at many points on the Thompson, Chilcotin, and Upper Fraser. In former seasons the Department obtained valuable data as to the size of the run by counting the sockeye taken by the Indians and hung on their drying-frames. Because the Indians were not permitted to fish this year no such data could be obtained.

In order to obtain data on the number of sockeye that reached the Thompson and Quesnel Rivers, and because Dr. Gilbert especially desired scales from the families of sockeye that frequent those rivers, the Department attempted to catch sockeye in both those streams by means of nets. Two gill-nets of 5¾-inch mesh were set in the Thompson River at Spences Bridge, one on each side of the river, in water through which sockeye pass in ascending. These nets were maintained there day and night from August 18th to August 29th. The number of salmon taken by the nets totalled six and were all males. The officers in charge of the nets kept a close watch on the rapids of the river both below and above the nets, and record that they saw no salmon except three taken by Indians and those taken by the nets. Had there been sockeye in numbers passing up the river at that time they would have been seen at the rapids.

and no doubt many would have been taken in the nets. These nets were operated during the time that in former years the run was at its height. A month after they were removed Officers Hickman and Newcombe, acting separately and on different dates, inspected the waters of Shuswap and Adams Lakes and found no evidence of sockeye having reached there, and very few were noted there by others at later dates.

The record on the Quesnel River discloses a condition as disastrous in its results as that on the Thompson. Not a single sockeye was taken in the gill-net set in the Quesnel River from August 28th to September 9th. Following the practice begun by the Department in 1903, a watchman was placed on the dam at the outlet of Quesnel Lake who acted throughout the past season. He reports that but three sockeye, two males and one female, were seen in the clear waters of the Quesnel River below the fishway and the dam. Former reports issued by this Department record that over 4,000,000 sockeye entered Quesnel Lake through the fishway during the fall of 1909, and that some 557,000 sockeye entered that lake in the fall of 1913, notwithstanding the blockade at Hell's Gate Canyon that season, which blockade was illustrated and described in the Department's reports of 1913 and 1914. This year, as stated, but three sockeye were seen there during the entire season. More conclusive evidence could not be produced to establish the practical extermination of the runs of sockeye to the Fraser than is presented by these records from two of its largest tributaries.

That there was but a small run to the Chilcotin River this year was established by an inspection of that river by me and from reports from the Indians at the head of the river at the outlet of Chilko Lake. At the time of my inspection I was told by Chilcotin Indians that, notwithstanding the order prohibiting them from fishing for salmon, dip-nets were used at several favourable points without capturing any sockeye. Dr. Gilbert's examination of the scales obtained from the run of sockeye at Hell's Gate Canyon by Overseer Newcombe in August discloses that it consisted of a perfectly homogeneous lot that were bound for the Chilcotin. (*See* Dr. Gilbert's report, page 47.)

Late in October and early in November a few hundred sockeye entered Seton Lake. There was no run there in August and September. Because a sufficient number of sockeye did not reach Seton Lake to warrant the operation of the hatchery it again remained closed.

Unquestionably there was a larger run of sockeye to the Birkenhead River, at the head of the Harrison-Lillooet Lakes watershed, this year than in any recent year. The run was so much larger than even in 1915 that it cannot altogether be attributed to the fact that the Indians were not permitted to fish at the Little Portage at the foot of Lillooet Lake. Fishery and Indian Agent Grant, who is an authority on the subject, and who has been stationed at the portage during the salmon run for a number of years past, states that a far greater number of sockeye passed through the rapids at the portage this season than at any time in recent years. The collection this year of 30,000,000 sockeye-eggs at the Pemberton Hatchery conclusively proves that the run was unusually large. The collection of eggs in 1918 totalled 11,960,000; in 1917, 5,270,000; in 1916, 25,750,000; and in 1915, 25,250,000. The collection this year exceeded the collection made in the brood-year of this season's run (1915) by 5,000,000 eggs. The fish came early and ran late. I am convinced that the run there this year was due to the successful operation of the hatchery in 1915. Conditions there are ideal for hatchery propagation. Superintendent T. W. Graham and the Department are to be congratulated upon such a satisfactory showing.

The run of sockeye to Harrison Lake and to the lower section of the Fraser River this season was larger than in any year since 1915. The number of sockeye that entered the trap at the entrance of the small stream from the retaining-pond at the hatchery at Harrison Lake contributed 4,000,000 eggs to the collection made for that hatchery this year. As the stream is an artificial one, consisting of the waters used in the hatchery, and no salmon have ever spawned there, naturally the run this year must be credited to the fry incubated in the hatchery and liberated through the retaining-ponds. The run to that small stream this year was far greater than to any of the natural streams tributary to Harrison Lake, save the Lillooet River, and the run to the latter passed on to the Birkenhead River. It is evident that the sockeye that entered the creek at the Harrison Hatchery and also the Birkenhead River must be credited to the successful operation of the hatcheries in past years. It is a most satisfactory showing.

Considerable concern has again been exhibited by those interested in conditions existing on the Fraser River at Hell's Gate Canyon. The statement made that the river-channel there is

still so blocked as to prevent the passage of sockeye to the waters above, and that the sockeye that reached there this year did not get through the canyon is untrue. The rocks that blocked the channel in 1913 were entirely removed in 1914-15 and the old channel fully restored. All the sockeye that reached there this year passed through the canyon without more delay than often occurred in the years before the slide of 1913. Conditions at Hell's Gate since 1914 have been and are now as favourable to the passage of all species of salmon as they were previous to the slides of 1913 and 1914. The Department has had the channel there under close observation every season since 1901. The rapids at Hell's Gate are the first real obstacle which the sockeye encounter in their ascent of the Fraser River. Until they reach there they have had no rapids of importance to overcome, and consequently are inexperienced in passing through such swift and broken currents. The result is that even at the most favourable stages of water they make repeated attempts before they succeed in finding their way through the Gate. This year, as in the years before the slide of 1913, there were short periods, in certain unfavourable stages of water, during which few (if any) salmon passed. On two occasions this season the run was delayed for several days, but all the salmon eventually succeeded in passing, so that the delay was not of material importance. The rapids at Hell's Gate are not more difficult of ascent at times than the rapids in the Fraser above the mouth of Bridge River, and are not nearly as difficult at all times as the rapids and falls at "the Hole" on the Chilko River, some miles above the mouth of the Whitewater River, yet the sockeye on reaching those places experience less delay than at Hell's Gate. At Hell's Gate and at the Bridge River Canyon all the sockeye apparently make the ascent close to the surface on either bank, and the same is true at Fish Canyon on the Chilcotin River, but at "the Hole" on the Chilko all apparently hug the rocks on the bed of the stream and none of them pass close to the surface. After viewing a run at Hell's Gate and then observing the sockeye at Fish Canyon on the Chilcotin River one cannot help being impressed by the certainty with which they attack and overcome the last-mentioned rapids. They show much more expertness in overcoming rapids and falls by the time they reach the latter rapids. From studying the conditions at Hell's Gate since 1901 I am of the opinion that the situation there does not offer a serious obstacle to the ascent of sockeye.

I have, etc.,

John Pease Babcock,

Assistant to the Commissioner.

Victoria, B.C., November 1st, 1919.

THE SPAWNING-BEDS OF RIVERS INLET.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—I have the honour to submit my report on the inspection of the spawning-beds of the Rivers Inlet watershed for the year 1919.

Since Dr. C. H. Gilbert's investigations have determined that the race of sockeye that frequent the waters of Rivers Inlet and spawn in the tributaries of Owikeno Lake consist of four- and five-year-old fish, the numbers of fish found there this year are compared with the numbers found there in the years 1914 and 1915.

Leaving Rivers Inlet Cannery on September 19th, I proceeded to the head of the lake. The three tributaries at this section are early-running salmon-streams, from which I am able to record very satisfactory results.

In Indian River, which was examined first, the salmon showed up remarkably well. The rapids all the way to the falls, half a mile distant from the mouth, contained large numbers of sockeye salmon corresponding very closely in numbers to the run here in 1914. In size they were under the average. No log-jams or other obstructions interfered with the movement of the fish up-stream.

Proceeding next to the Washwash River, situated on the other side of the lake, it was satisfactory to note a big run of sockeye salmon. The spawning-beds for a distance of two miles were literally crowded with fish. It is necessary to recall the exceptionally big run which spawned in this tributary in 1914 and 1915—the brood-years from which the present run resulted—to approach the numbers observed on these spawning-beds this year. The males and females were equally represented and came well up to the average in individual size. A few small grilse were seen.

The work of clearing the log-jams from the mouth of this river by Engineers of the Dominion Department of Fisheries, under the direction of Mr. McHugh, in the spring of this year calls for most favourable comment. Where in former years it was difficult to follow the course of the stream owing to the log-jams which obstructed the mouth, these have now been removed and permit the salmon to reach the extended beds above. It is to be hoped that the good work undertaken by them will be repeated each year. An example of how quickly a freshet will destroy labour of this description is shown by a log-jam which completely obstructed a small branch stream situated on the right side of the Washwash, leading into the main river above; while thousands of sockeye salmon were spawning on the beds, a very large number were congregated below the recently formed obstruction unable to proceed farther.

The Cheo River, lying midway between the Washwash and Indian Rivers, received its full complement of sockeye salmon this year. The spawning-beds were thickly covered with spawning fish. Judging from the numbers observed below the falls, the removal of the log-jam permitted the sockeye to reach this part of the river. The run there this year compared very favourably with the brood-years 1914 and 1915. In size the fish were not, however, up to the average.

On returning from the head of the lake inspection was made of Sunday Creek. With the exception of a few sockeye swimming around on the spawning-beds at the mouth, there was nothing to indicate abundant seeding. The numbers did not compare favourably with the runs of 1914 and 1915. This creek had again changed its course.

There were no salmon to be seen as we proceeded through the Narrows, the high stage of the lake preventing observations of the gravel-beds. The approach to the Sheemahant River, the most productive salmon-stream of the lake, was crowded with sockeye and prepared me for the unquestionably large run of fish which were making full use of the eighteen miles of spawning area at their disposal. The males appeared to outnumber the female sockeye salmon in the proportion of four to one, indicating that spawning had just begun. In point of size they were below the average. There are no obstructions of any kind in the stream to interfere with the movement of the fish. The inspection was conducted too early to arrive at any conclusion in regard to the run of cohoe salmon.

The Dominion Department of Fisheries, in effecting a clearance of the log-jams in Jeneesee Creek, are to be congratulated on the results achieved. The spawning-beds which have now been opened up to the salmon permitted the remarkable run which came in to seed the beds to their full capacity, the hatcherymen obtaining a total of 3,000,000 eggs from this creek.

In no other years, with the exception of 1913 and 1914, have so many fish been found in Jeneesee Creek. As in 1915 few sockeye salmon entered this stream, it suggests a theory in favour of a run of five-year sockeye; the salmon again were larger than those encountered at other streams in the Owikeno watershed this year.

The number of sockeye salmon which reached the spawning-beds of the Machmell River was again every difficult to estimate. This stream with its thick muddy water prevented all efforts to observe the fish in the river-bed, but in the shallows farther up a few sockeye were seen breaking water, indicating that there were fish there. The quiet waters of the Nookins River, a tributary to the Machmell, evidently attract the greater portion of the run of sockeye. In the clear water for a distance of three or four miles the fish were seen spawning on the beds in exceptionally large numbers, and in the lower portion of the river big schools were noted, evidently waiting until they were in a ripe condition. The inspection revealed a run equal to those of 1914 and 1915. No log-jams obstruct this river.

In making the inspection of Asklum River every facility was afforded to obtain an uninterrupted view of the river-bed all the way to the falls, due to the low stage of the stream. In the clear water thousands were observed spawning on the gravel-beds, but in estimating the numbers of sockeye to be seen here it was noticeable that the run did not compare with the big runs recorded in 1914 and 1915. There is no doubt, however, that the beds were being bountifully seeded. In size the fish were smaller than in former years, the males outnumbering the females four to one. The log-jams referred to in previous reports have received attention from the Department of Fisheries and no longer seriously interfered with the run.

The Dalley River, situated about six miles from the mouth of the lake and directly opposite Quap, was well supplied with sockeye salmon. The spawning-beds did not contain many fish, but large schools were observed waiting below in the clear water; in some places the river was literally black with them. I have no hesitation in recording a run equally as great as the number which made their appearance here in 1914 and 1915. In size the fish represented only a fair average. No obstructions of any kind interfere with the spawning-beds, which should produce a big run from this season's spawning.

From the Quap the hatcherymen secured 14,000,000 sockeye-eggs. They could, I am advised, have taken double that number had they desired. After they stopped taking eggs a vast number of fish were permitted to ascend the stream. The work of the Dominion Fishery Engineer, Mr. McHugh, in the removal of the log-jams from this creek's bed, cannot be too highly commended, since it has restored the entire creek-bed to spawning fish.

The gravel-bars at the mouth of the lake and situated around the Indian rancherie were not overstocked with salmon on my first visit, but an improvement was shown on my return; the sockeye were beginning to cover the spawning-beds in large numbers. It is usual for these fish to drop back from the lake when they are ready to spawn.

The Owikeno River was too discoloured to estimate the number of spring salmon, but evidence was not lacking that the run of this species of fish was well up to the average. The cohoe run was exceptionally large in point of numbers, but they arrived after the fishing season and too late for the canneries to reap the benefit.

Taking into consideration the comparatively poor pack obtained by the canneries at Rivers Inlet this season, it is surprising that the spawning-beds did not show a correspondingly poor seeding. The exceptionally large number of sockeye salmon observed spawning on the beds, and noted in tens of thousands schooled up in the deeper portions of the various tributaries, precludes the opinion generally expressed by the canning fraternity that the run this year was a small one. My inspection showed that the spawning-beds were as abundantly seeded as in 1914 and more so than in 1915. As the sockeye, generally speaking, did not reach an average standard in size, the poor catch may be attributed to their having passed through the nets. Fishermen whom I interviewed during the fishing season time and again deplored their luck in seeing hundreds of salmon pass completely through their nets.

The extension of the weekly closed time had its effect. Because I found the spawning-beds on the tributaries of Owikeno Lake so abundantly seeded this year, I look for a favourable return in the runs four and five years hence.

In conclusion, I wish to express my thanks to G. L. Johnston, of Rivers Inlet Cannery, Captain Hamer, of the Dominion Hatchery, and the various officials connected therewith, to whom I am indebted for many attentions.

I have, etc.,

ARTHUR STONE,

Fisheries Overseer.

Rivers Inlet, B.C., November 8th, 1919.

THE SPAWNING-BEDS OF SMITH INLET.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—In pursuance of instructions from the Department to make an inspection of the watershed at Smith Inlet, I have the honour to submit the following report for the year 1919:—

Proceeding to Smith Inlet at the conclusion of my visit of inspection to Lake Owikeno, arrangements were made with Indians, after which departure was made for the spawning-beds situated at Long Lake, four miles and a half from salt water.

The peculiar characteristics displayed by the Rivers Inlet race of sockeye salmon, in that they represent practically four- and five-year fish, is demonstrated in the race which return to Smith Inlet to spawn; consequently, in making comparisons, it will be necessary to refer to the 1914 and 1915 runs—the brood-years from which the present run of sockeye resulted.

Long Lake is about sixteen miles in length and contains two rivers and one small creek, which, with the exception of some fine gravel-beds situated along the shores at the head of the lake, comprise the only spawning-grounds for the salmon.

The Docee River (the overflow to the lake) afforded every facility to estimate the number of sockeye salmon, since the water was very low and clear. The run here is well up to the average of former years, large numbers being noted both in the river and along the shores at the mouth of the lake.

Arriving at Quay Creek, situated about seven miles from the mouth of Long Lake, an inspection was made of the spawning-beds. The exceptionally big run which I am able to record compares very favourably with the number seen here in 1914.

The spawning-beds both inside and outside the creek were well covered with spawning fish. In a deep pool at the foot of the falls a very large number of salmon were congregated, making futile efforts to surmount the insuperable barrier which at present bars them from reaching a small creek above leading to a lake half a mile inland. If this barrier could be removed by building a fish-ladder and blasting out a log-jam which has formed at the foot of the falls, great advantage to the fish would result. It is apparent that this creek only receives the sockeye in exceptional numbers every fourth and fifth year, the three following years having shown comparatively poor returns, but this should not prevent an effort being made to clear the obstruction referred to.

Conditions at the head of the lake, where the greater portion of the sockeye-spawning beds are situated, was practically a repetition of that which was recorded in 1914 and 1915. The gravel-bars at the mouth of the Geluch River (or Smoke-house Creek, as it is termed by the Indians) was crowded with sockeye salmon. Going up the river to the falls about three miles and a half distant, the fish were observed in dense masses lining the beds; the small mountain streams emptying into this river all bore the same tale; every foot of available spawning-ground had been utilized for the propagation of spawn. In numbers the males appeared to be in greater proportion than the female salmon and in size attained a fair average. The river-bed is free from any obstructions; consequently the fish should experience no difficulty in providing sufficient seed to produce a run four and five years hence equal to the present one.

The fine gravel beach which lies at the entrance of the Delabah River and along the shores of the lake did not show anything like the number of sockeye salmon recorded here in 1914. It will be recalled that a milling mass was the description applied to the vast numbers in that year. The run of 1915 describes more accurately the situation here, although evidence was not lacking that eventually a very big run would reach this section, since the lake appeared to be well stocked with salmon to judge by the numbers breaking water.

From the mouth of the Delabah River to the falls one mile and a half distant tens of thousands of sockeye crowded the spawning-beds, while in the deep pools schools were noted bunched together waiting. The scene presented a close parallel to the extraordinary number recorded in 1914. No log-jams or other obstructions prevented the fish enjoying full possession of the spawning-beds at their disposal. The only drawback to successful propagation of spawn would be in the nature of the river-bed, composed principally of rocks and pebbles; otherwise I have no doubt the thousands which will seed the beds will provide for an equally big run when the fish return as adults from this season's spawning.

A number of small mountain streams were examined on the way back to the mouth of the lake, and at the entrance to each small bunches of sockeye were in evidence.

One or two small schools of cohoe salmon were noted making their way up the Docee River to the lake; no comparison, however, can be made with the number seen last year, but this may be attributed to their late arrival from salt water, since I noted large numbers breaking water in Smith Inlet on our way back to the cannery. The humpback run was very small and corresponded closely to the numbers recorded at Rivers Inlet this season. The dog-salmon, on the other hand, arrived in considerable numbers, and from this species a good run may be expected from the results of this season's spawning.

The comparatively small pack of sockeye salmon put up by the two canneries at Smith Inlet, amounting to about 16,000 cases, when contrasted with the big pack of 28,000 cases in 1914 and 35,000 cases in 1915, calls for some explanation as to why more fish were not caught on the fishing-grounds this year, since the spawning-beds have been shown to have been so abundantly seeded. The answer may be summed up as follows: The action of some of the gill-net fishermen in forcibly restraining the Wallace Fisheries from fishing their seine-nets during the height of the sockeye run permitting tens of thousands to escape capture. I am given to understand that during the four or five days the seines were not in use a milling mass of fish occupied the seining-grounds which lie inside the gill-net fishing boundary, having successfully negotiated the large number of gill-nets distributed over the inlet; all these fish in consequence reached the spawning-beds.

Summing up the results of the inspection to this watershed, I have every reason to look forward optimistically to a big run which will return here as adults from this season's spawning, since the spawning-beds received a run closely resembling the vast numbers recorded in 1914.

I have, etc.,

ARTHUR W. STONE,
Fisheries Overseer.

Rivers Inlet, B.C., November 8th, 1919.

THE SPAWNING-BEDS OF SKEENA RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

Sir,—In accordance with instructions, I made a tour of inspection of the spawning-beds of the Skeena River, and beg to submit the following report thereon:—

On September 7th last I arrived at Donald's Landing, which is thirty miles from the head of Babine Lake. The following day I went to 15-Mile Creek; here I met Mr. Crawford, Superintendent of the Stuart Lake Hatchery, who was engaged in spawning sockeye-eggs for the Stuart Lake Hatchery. He informed me that he had commenced spawning here on September 2nd and up to this date he had obtained approximately 1,400,000 eggs; he intended to get a supply of 3,000,000 eggs altogether from this creek. I was informed before I left Babine that he was successful. Mr. Crawford also informed me that he had started spawning at Pierre Creek on August 19th and had obtained approximately 3,400,000 sockeye-eggs. From the two creeks he expected to collect his full supply for the Stuart Lake Hatchery, amounting to 7,500,000 eggs.

There was a large run of sockeye in 15-Mile Creek, and from all reports obtained I would say that they were up to the average of any previous years. This creek will be seeded abundantly; the males and females were evenly balanced. There were twelve Indian families from Stuart Lake putting up their winter supply; they were having no difficulty in obtaining all they wanted, as they were given a large number of the salmon that were spawned by Mr. Crawford. Their racks and smoke-houses were well filled. The Indians catch rainbow trout, which congregate at the mouth of this creek, feeding on salmon-eggs.

I then called in at 4-Mile Creek, which was almost dry, but there were a number of sockeye at the mouth and some were spawning in the gravel that had been washed down when the water was high. It was impossible for the salmon to get up owing to the lack of water. I was informed by the Dominion Guardian that a few had been able to get up a short distance before the creek subsided, and that in all probability the eggs which were left would be lost.

I then proceeded on to Beaver Creek. At the mouth the water was very dark and I could not see any salmon, so went up the creek a considerable distance expecting the water would be clearer. At times I could see sockeye, but not in large numbers. I was informed that the first sockeye were seen here on July 25th, and that this is considered one of the early spawning creeks of Babine. There are many obstructions of log-jams and beaver-dams. The Indians informed me that when the water gets low the salmon have great difficulty in getting over these obstructions, and when the dams are broken down the beaver rebuild them. Five Indian families from Stuart Lake attempted to obtain their winter supply from this stream, but they were unsuccessful and had to go to 15-Mile Creek to procure the quantity required.

On September 9th I visited Pierre Creek and saw very few live sockeye salmon, but large numbers of dead ones, which I presume had been spawned by Mr. Crawford. On going up the creek the number of dead salmon increased and the stench was unbearable. Mr. Crawford informed me that there was a very large run of sockeye here when he was spawning on August 19th, and that it would be well seeded. This is the earliest creek on Babine Lake for the sockeye spawning. There were no Indians putting up salmon at the time of my visit. This creek could be improved greatly by clearing out a number of the log-jams. On returning to the mouth I saw quite a number of sockeye, which were spawning in the fine gravel that had been washed out from the creek. On proceeding down the lake I saw sockeye close inshore; they were jumping and playing around. I went over to see if there was any creek near by, but there was none for miles on either side. From what I could observe through the dark water they were spawning in the fine sand of the lake-shore.

I arrived at Salmon Creek on the afternoon of September 10th and proceeded up to the Babine Hatchery, a distance of two miles and a half. In this creek I saw great numbers of sockeye, also cohoes, which were beginning to run. There is a good gravel bottom the whole length of the creek and several very deep holes. On arriving at the hatchery I met Mr. Gibbs, the Superintendent, who showed me his barricade at the entrance to Morrison Lake, where eggs are collected. All along the barricade were large sacks of hay, placed there in order to protect

the salmon when they jumped. In jumping they would strike the sacks and fall back into the water uninjured. Mr. Gibbs informed me that he would easily get his supply of sockeye-eggs there. He intended to take 8,000,000 eggs. Although the hatchery has a capacity of 10,000,000, he finds better results are derived from giving them plenty of space. There are several retaining-ponds where the fry are retained for three months, and sometimes longer, until they are well fitted to protect themselves from their enemies. The sockeye appeared to me to be much larger in size in this creek than in any other tributary of the lake. Upon mentioning this to Mr. Gibbs he agreed with me, and said that there was quite a difference, but could not account for it. There were three distinct runs to this creek; the first two the males and females were equal, but on the third run Mr. Gibbs thought the males would be in excess by four to one. The run to this creek will average as well as in any previous year. After the supply of eggs is taken for the hatchery there will be sufficient left to seed the creek by natural propagation. Mr. Gibbs further informed me that the hatchery had been in operation on this stream for fourteen years and that he had never seen a larger run of sockeye there. On the morning of September 11th, as I was leaving, the hatchery crew commenced to take spawn. On returning to the mouth I saw a number of humpbacks jumping. There was one Indian family putting up their winter supply, which they had almost secured.

On September 12th I went down the Babine River about eleven miles. On this stretch of water, where there are good spawning-beds, the sockeye were not numerous, but there were humpbacks in large numbers; the water was alive with them and especially at the old barricade site. They were not endeavouring to go any farther up and were spawning in the river. It is on this stretch of water that the Babine Indians get their principal supply of salmon. There were ninety-five families represented here; all their smoke-houses and drying-racks were well filled; they were able to secure their supply with little difficulty. Upon making inquiries as to what would constitute a reasonable supply for one family, I would estimate it to be from 1,000 to 1,200 salmon per family. The number of salmon that will be smoked this season by Babine and Stuart Lake Indians will amount to approximately 130,000, which will consist mostly of sockeye, and the number of cohoes that they secure for feeding their dogs. The Dominion Government supplies each family with 125 feet of gill-net; they stake their nets out in the evening and take them up in the morning. There is a weekly close season from 6 a.m. on Saturday until 6 p.m. on Sunday. The Indians are permitted to use nets there in place of the barricades formerly built across the river. The substitution is a beneficial one. There is now no waste and an abundance of sockeye are permitted to enter Babine Lake to stock all its tributaries. There are two Dominion Fishery Guardians who patrol the lake and see that the Indians do not get their nets across the creeks and prevent the salmon from going up. I was informed by the Fishery Guardians that the first salmon appeared in Babine Lake on July 21st, which is one day earlier than last year, and that between the end of July and the first week of August the Babine River was a solid mass of fry on their journey to the sea. Nilkitkwa Creek is very small and runs into the Babine River; the humpbacks were in large numbers, also a few cohoes.

On September 13th I proceeded to Tachek Creek and arrived there on September 14th. On going up the creek a considerable distance I saw sockeye in large numbers, all spawning. This is a very fine tributary of the Babine Lake, as there are a few miles of fine gravelly bottom. The sockeye were well distributed all over the creek. I did not see many salmon at the mouth, although the water was quite clear; I was informed they usually run up at night. There were three Indian families here from Stuart Lake putting up their supply; they told me they had about 800 per family, but were complaining of not catching many, as the water was clear and the salmon could see their nets. From information received I would say that the run in this creek was up to the average of previous years. On questioning the Indians here and elsewhere as to the general run of salmon to Babine Lake this year in comparison with other years, they said: "Lots of salmon this year."

This was the last point of interest on Babine Lake. I returned to Donald's Landing on September 15th, leaving the next day for the Indian village, Awillgate, three miles from the old town of Hazelton, arriving on September 19th. Twenty-five families reside there. I was informed by the Indian Agent and also by the Dominion Fishery Guardian that 80 per cent. of the Indians, who were in the habit of catching salmon at the Bulkley Canyon, had now abandoned the practice and have adapted themselves to living by cultivating their gardens and other means. On looking around the old smoke-houses in the vicinity I was able to substantiate

this report. I only saw four smoke-houses that had been in operation; two had a fair quantity of dried salmon and from the other two the salmon had been removed. There were eight or nine smoke-houses abandoned. At the time of my visit there were no Indians taking salmon; their method of catching them here is basket-trap, dip-net, and spearing. They have platforms on the side of the canyon, where they stand, and when the salmon endeavour to pass through they spear them. I saw no salmon as the water was very discoloured, but was informed by the Dominion Fishery Guardian that they were in large numbers about August 15th and that the average was up to that of previous years.

I left Hazelton on September 21st and arrived at Lakelse Lake in the evening. I met Mr. Catt, Superintendent of the new hatchery.

The following day I visited Blackwater Creek, but did not see many sockeye; Mr. Catt informed me that they went up early in August. I saw evidence of dead salmon on the banks which were taken out by bears and eagles. This creek has a gravelly bottom and I believe was well seeded. On returning to the mouth I saw a number of humpbacks which were spawning. I then proceeded to Williams Creek, which is a short distance from Blackwater; here I saw humpbacks and a few sockeye. This is considered the important spawning creek of Lakelse Lake and has a good gravelly bottom for a mile and a half. Mr. Catt also informed me that the sockeye run up this creek early in August and in very large numbers; the males and females were evenly balanced. The sockeye that enter Lakelse Lake stay in the lake for about six weeks until they are ready for spawning, and then proceed up the creeks to spawn. The first salmon were seen in Lakelse Lake this year on June 3rd, which is earlier than in previous years, as they generally appear on June 8th or 9th. A large number entered the lake this year before the fishing opened on the Skeena River. In the afternoon of September 22nd I visited Lakelse River. From the lake to the old hatchery the channel was literally filled with a mass of spawning humpbacks. From the old hatchery to the Skeena River, a distance of twelve miles, I was told there were vast numbers of spawning humpbacks. Lakelse River is a fine gravelly spawning-bed; the water is very clear and salmon are very easily seen, but I saw very few sockeye there. I went up Coldwater Creek; the humpbacks were there in large numbers, but no sockeye. I was informed that sockeye never go up Coldwater Creek.

On September 23rd I went up the four small tributaries of Granite Creek; they all branch off about a mile and a half above the lake. There were no salmon above that point, as the creek-bed is very rough and filled with large rocks and boulders. I saw a fair number of sockeye below the forks. Bears do great damage to the salmon in these tributaries; it is not the number they eat, but the number that they destroy, as they generally take one bite and then fish for another one. The salmon are at their mercy, as the creeks are narrow and shallow; I was told the bears destroy thousands.

I then proceeded to Scallabuchan Creek; the sockeye run here early in August. I saw a fair number spawning, but from information received I believe this creek was well seeded. Mr. Catt expects to take all his spawn here next year, as the new hatchery will then be ready for operation. The new hatchery is situated a mile and a half from the lake on Granite Creek, just above where the four small tributaries branch off. The water there is very clear and cold. At present the foundations are laid; they are of concrete, 120 feet in length and 40 feet wide, including a drain in the centre, 6 feet wide and 18 inches deep, running the whole length. It will be used as a retaining-pond for young fry. The hatchery will not be built until spring and is expected to be in operation in September, 1920. The delay in construction was caused by the strike last summer. Its capacity will be 10,000,000 eggs. The Dominion Government has built a road from the hatchery to the lake in order that they may have easy access to either end when collecting their eggs.

I wish to express my appreciation of the kind assistance proffered me by the Hatchery Superintendents and also Mr. Norrie, Dominion Overseer, to whom I am indebted for valuable information and assistance. From the facts at my disposal I have without hesitation to say that the tributaries of the Skeena River were well seeded this year, fully up to the average of any previous years.

I have, etc.,

WILLIAM A. WISLEY,
Fisheries Overseer.

Prince Rupert, B.C., September 17th, 1919.

THE SPAWNING-BEDS OF THE NASS RIVER.

Hon. Wm. Sloan,
Commissioner of Fisheries, Victoria, B.C.

SIR,—In obedience to instructions from the Department to inspect the salmon-spawning beds of the Nass River, I beg to inform you that in company with J. Maxwell Collison, of the Dominion Fisheries Department, I visited the Meziadin Lake basin and the salmon-streams in the Ayansh District. We respectfully submit the following report:—

MEZIADIN LAKE DISTRICT.

We left Arrandale, at the mouth of the Nass River, on the Dominion Fisheries patrol-boat "Thos. Crosby" for Stewart on September 11th, taking with us two Indian packers. Arriving at Stewart on the night of the 11th, we proceeded to get our outfit together and left that place on the morning of the 13th, having pack-horses to take our outfit as far as possible. The outfit was packed to the Government cabin on the west side of the Bear River Glacier, and we shouldered our packs for the trip into the interior. We encountered many difficulties and obstacles on the way in owing to the trail being overgrown with dense brush and all of the bridges having been washed away. The trail at the side of the Bear River Glacier is also in very bad shape, it having entirely disappeared for about a distance of 400 or 500 yards, which compelled us to get right on to the ice to get across. This is rather dangerous work when you have a heavy pack on your back, as the ice is smooth and shelving. After overcoming the difficulties of the glacier we proceeded on down the Beaver River, which empties into Meziadin Lake at its westerly end. The trail down the Beaver is in very bad shape owing to the river having changed its course and washing out the trail completely in places, and compelling us to cut our way through the dense brush. We also had to ford the Surprise River, which empties into the Beaver about four miles from its mouth. Surprise River was very high at the time of our visit, and in fording it we were waist-high in the water. On reaching the head of Meziadin Lake we had to build a raft to take us down the lake, there being no canoe to be found. After completing the raft we started down the lake along the north shore. For a distance of about a mile and a half from the head a few spawning sockeye salmon were to be observed, but were much less in numbers than were seen on previous trips at this particular place. Very few salmon were leaping in the lake. We reached McBride Rapids, Meziadin River, about a quarter of a mile below the outlet of the lake, in the evening; unloading our outfit, we run the rapids with the raft, then camped for the night. It rained hard. In the morning we continued on our way. At the foot of McBride Rapids there is a splendid spring-salmon spawning-ground, but there were not as many spawning spring salmon there this year as we noted in previous years. We also run the second rapids in the Meziadin River with the raft. These rapids are about a mile above the fishway. We arrived at the fishway and falls at noon on September 19th. We inspected the waters in this vicinity in the afternoon. Very few salmon were to be seen at any place here, either in the basins of the fishway or immediately below the lower or upper falls. As it was a very cloudy day we were not able to take any photos. The next morning was very fine and we proceeded to make a thorough inspection of conditions. At the falls and fishway there was a great scarcity of salmon, very few to be seen at any place, and during the whole time that we were there we only saw one salmon try to leap the fall. There were not more than ten salmon in the pockets of the fishway at any one time. It has been usual in the past, and at this time of the year, to see at least 200 salmon in the pockets of the fishway, and also to see hundreds congregated below both the main and second fall, and continually leaping in their eagerness to reach the waters above, but this season there were so few salmon that only a trained eye would know that it was a salmon-stream. On our return trip up the lake we inspected McLeod Creek and Hanna River for a considerable distance, but did not see a single salmon. We next crossed over the lake to the south side, following this shore up. For a distance of about four miles a few spawning sockeye were to be observed in places. At the extreme head of the lake at the south-west corner a considerable number of spawning sockeye were to be seen; in fact, this was the only place in the Meziadin watershed where salmon were to be observed in anything like the numbers as reported on previous visits of inspection. At the time of our visit the waters of the lake were very high, much higher than usual.

Conditions at the Fishway.—In making an inspection of the fishway we noticed that some great changes had occurred since last we were here two years previously. The large dump of rock that was on the outer side of the retaining-wall of the fishway has all been washed away, also the retaining-wall for one-third of its length and 10 feet in width has gone. At the present time the retaining-wall is 40 feet in length and 5 feet in width. The outer part of the retaining-wall is composed of rock in formation and gravel, and the inner side is of rock. The nature of the rock is slate and is very badly checked for its entire length. The main river is now running alongside of the outer wall, and the river is seeping right through the wall into the fishway in places. The wing-dam that was in the main river above the intake of the fishway has been displaced and is now lying along the river-bank. There are two trees resting on the wing-dam, and right across the intake of the fishway. The main wall of the fishway, where the crib-work is, has also suffered by flood. Two of the braces that shored up the crib-work two years ago are gone. They were toed into the retaining-wall and carried away when its lower end was destroyed.

There is also a quantity of rock displaced, which has dropped into the third pocket of the fishway. It has made quite a gouge in the wall and has taken away the support for the crib-work at this place. The old crib-work is also showing signs of decay and dry-rot. At the time the fishway was built there were four pockets. The first or lower pocket is pretty well filled up with rock from the washed-out dump. Below the fishway there is a quantity of rock deposited in the river, which was a part of the dump before mentioned. It is possible that the high water that caused the damage to the fishway came shortly after our trip of inspection in 1919, as all of the Upper Nass was visited with great floods in the fall of that year, washing some of the Indian villages completely out of existence.

After finishing up our inspection of the Meziadin watershed we had to repair to the Ayansh District. As all of the bridges and cables for crossing rivers had been washed away between Meziadin and Ayansh, it was necessary for us to go into this district by way of the mouth of the Nass; therefore returning, we arrived at the town of Stewart on September 24th. Owing to the uncertainty of means of travel in these unsettled districts it was necessary for us in order to get to Arrandale to take a steamer to Prince Rupert, then change boats for Arrandale. Arriving there we paid off the two packers that we had, procured some more provisions, and obtained passage on an Indian's motor-boat for Ayansh. The distance from Kincolith, at the mouth of the Nass, to Ayansh is over seventy miles, and the waters are very swift, making very slow travel on the upward journey. We left Kincolith on the afternoon of September 30th, and after a slow and tedious trip arrived at Ayansh on the evening of October 2nd.

Ayansh District.

On Friday, October 3rd, we obtained an Indian guide and inspected the Saskinisht River on the 3rd and 4th. This river empties into the Nass two miles above Ayansh. We went up the Saskinisht as far as the falls. The salmon that enter this stream are spring, cohoe, dog, and steelhead. Humpback have been seen here, but there were not many this year. It is impossible for salmon to ascend above the falls. At the time of our visit there were no salmon congregated below the fall, but from information gleaned from the settlers in this district there was a good run of spring salmon this year. In the lower reaches of the river there was quite a fair number of cohoe and dog salmon, and for the size of the stream we consider that it was well seeded by the specie of salmon that enter it. The distance of the river from its mouth to the falls is about seven miles, and some splendid spawning-grounds were to be seen for the whole distance.

Seaks River.

On Monday, October 6th, we commenced our inspection of the Seaks watershed. This river empties into the Nass about four miles above the canyon and about the same distance below the village of Ayansh. We started our inspection at the mouth of the river and continued our way up to the falls, which by the irregular course of the river is a distance of some ten miles. The salmon that enter this river are sockeye, spring, cohoe, dog, and steelhead. The sockeye do not continue on up the Seaks to the falls, but head off up a creek known to the Indians as the Ginglith Creek, which flows into the Seaks about two miles from its mouth. We followed the Ginglith up for several miles and no spawning salmon were to be seen at the time of our visit, but there was considerable evidence that there had been a fairly good run, as quite a number

of dead fish were strewn along the creek-banks. From information obtained from the Indians, this stream in former years had been a good sockeye-stream, but in later years the run had greatly diminished; however, the conditions this season were much better, they said, and compared favourably with the good runs of former years. We were also informed that the sockeye that enter this stream are the first that come into the Nass, which statement was practically verified by the fish having all been spawned out by the time we reached there. It is an ideal spawning-ground for sockeye salmon and was free from any obstruction.

After having inspected the Ginglith we continued our way up the Seaks, arriving at a small lake about six miles from the mouth, this lake being formed by the flow of lava, which forced the river against a high bank of rock, thus forming a narrow canyon with a lake at the upper end. This lake, known as the "Tamdeathal," was literally alive with cohoe salmon, which were on their upward journey. There were numbers of spawning spring salmon in the river and at the outlet of this lake. Continuing up, we finally reached the falls, they being from 15 to 20 feet in height, making it impossible for the salmon to ascend any higher. The nature of the river above the fall is not in our opinion suitable for spawning salmon, as the river-bed is formed of lava and rock. We did not at the time of our visit see any salmon at the foot of the fall, it being too early for the cohoe, which were then working their way up. From information from the Indians of the district, the salmon go up the river as far as the fall, remaining there for a short while, then return to the lower reaches of the river, which are exceptionally good for spawning.

SUMMARY.

In making a summary of our inspection, we wish to call your attention to the very few sockeye salmon on the Meziadin spawning-beds this season. It is apparent that something very vital has happened to the sockeye of the Nass to cause such a shortage. As the pack at the canneries at the mouth of the Nass this season was only an average pack, plenty of sockeye salmon should have reached the spawning-grounds had there been an average-sized run. The only explanation that we can give for such a shortage is the operation of traps in South-eastern Alaska, there having been this season fourteen or fifteen traps in operation between Cape Fox and Tongas Island. What number of Nass sockeye were taken in those traps we are unable to say, but from reliable information they intercepted Nass sockeye.

The salmon-streams in the Ayansh District appeared to have a fair amount of spawning fish in them, and the watercourses were in good condition up to the falls, which is as far as salmon can get up. There was also a good supply of fresh-run cohoe and dog salmon coming up the Nass River while we were there. It is impossible for us to compare the run of salmon to these streams this season with former years, as this is our first inspection of this watershed.

In reference to the present condition of the fishway, it is important that steps should be taken to put it into good condition as soon as possible. A considerable amount of work will have to be done here, and we would advise that work of a permanent nature be put in, so that the fishway will hold for all time. Before any permanent work can be commenced on the fishway it will be necessary to have the trail put into condition, so that an outfit can get in on pack-horses to the head of the lake from Stewart. At present it is not possible to take horses any farther than the Government cabin on the west side of the Bear River Glacier.

Yours obediently,

CHAS. P. HICKMAN,
Inspector of Provincial Fisheries.

J. MAXWELL COLLISON,
Dominion Fishery Officer.

New Westminster, B.C., November 6th, 1919.

CONTRIBUTIONS TO THE LIFE-HISTORY OF THE SOCKEYE SALMON.
(No. 6.)

BY CHARLES H. GILBERT, PH.D., PROFESSOR OF ZOOLOGY, STANFORD UNIVERSITY.

I. THE FRASER RIVER SOCKEYE RUN OF 1919.

(1.) THE AGE-GROUPS AND THE SUCCESSION OF RACES.

Now that the Fraser River sockeye run has apparently established itself in a state of decline, it is interesting to ascertain what effect (if any) this impoverishment of the school will have on its internal structure. During the period of violent oscillations between relatively good years and bad, there were, as we have noted previously in these reports, corresponding fluctuations in the composition of the runs. Good runs in this basin usually have been signalized by a high percentage of four-year fish, and conspicuously poor years by a high percentage of five-year fish. But whenever the run becomes stabilized, at a low level, the reasons for these fluctuations have disappeared, and the average percentages of four-year and five-year fish re-establish themselves in the relations they occupied before the run had suffered impairment.

In this discussion we give consideration only to the prevailing Fraser type of sockeyes, which are characterized by the fact that after hatching, and before seeking the sea, they spend one year and only one year in fresh water. Our method of determining percentages of age-groups during the run lacks strict accuracy, but can be depended on for approximate results, which are available for purposes of comparison between the years. Samples are taken at nearly uniform intervals throughout the run. The earlier and later samples represent few fish, as the run was then weak, while comparatively few samples in the middle of the series may represent a majority of all the fish of the season. We cannot obtain data which would enable us to weight our figures in accordance with the state of the run when they were obtained, but commonly reach results which are very similar to the conditions obtaining at the height of the run. As long as this is the case we cannot go far wrong.

In 1919 the lowest percentage of four-year sockeyes running at any time was 23 per cent. and the highest was 100 per cent. The midway point between these was reached (as shown in Tables I. and II.) during the latter half of July, just prior to the period when usually the Fraser run of sockeyes is at its maximum. During the next period, from August 1st to 15th, the percentage of four-year fish had risen from 65 to 82. Somewhere between these two must lie the true percentage of four-year fish for the year, and inasmuch as the August sockeyes which run during the first half of the month are ordinarily more abundant than those appearing during the latter half of July, the true percentage lies doubtless nearer to 85 than to 65. Following the usual sampling method which we have employed, we reach the result 76 per cent. for the seasonal proportion of four-year sockeyes (one-year-in-lake group) and 24 per cent. for the five-year sockeyes of this group. It would seem that these figures must closely approximate the true values.

Comparing them with previous years, we find the results very similar to those obtained in 1916 (*see* Report for 1917, page 34), when 76 was the percentage of four-year fish running during the height of the season, from July 27th to August 10th. In both of these years the runs were sadly depleted, with a total pack on both sides of the boundary of little more than 100,000 cases. Another season, belonging to the recent precipitous decline of the Fraser fisheries, and worse than either 1916 or 1919, was 1918. During this year, when less than 72,000 cases represented the total pack of Fraser sockeyes, the percentage of four-year fish was 77. The results obtained during these three years, therefore, are practically identical, and can be contrasted with those similarly obtained during 1912, 1914, and 1915, which are the initial years of the four-year cycles, to which belong 1916, 1918, and 1919.

	Cases.	Per Cent.
1912	325,451	90
1914	555,557	85
1915	155,714	61
1916	116,783	76
1918	71,572	77
1919	103,200	76

Another instance of extreme variation was in 1911, when with a pack of 155,714 cases the four-year fish were present in only 54 per cent. of the total run of their group. The experience in 1919 serves as further confirmation of the following conclusion, stated in 1918 (*see* Report for 1918, page 37): "Striking changes in the relative proportions of age-groups in successive years accompany violent alternations of good and bad years. In such cases we find the poor years in such a series are signalized on the Fraser by a high percentage of five-year fish. But when the runs have declined almost uniformly to a low level, as seems now to be the case, the age-groups regain their normal relations and remain about the same from year to year."

We give below the proportion of the two principal age-groups on the Fraser for each of the dates on which samples were taken in 1919.

Table I.

	June 9.	June 17.	June 26.	July 2.	July 15.	July 20.	July 25.	July 28.	July 30.	Aug. 4.	Aug. 8.	Aug. 12.	Aug. 15.	Aug. 21.	Aug. 24.	Aug. 26.	Aug. 29.	Sept. 3.
Per cent. four-year fish	23	43	85	73	61	64	57	64	77	67	82	87	87	97	98	97	100	94
Per cent. five-year fish	77	57	15	27	39	36	43	36	23	33	18	13	13	3	2	3	0	6

An interesting comparison can be made between the above table and a similar table prepared for the run of 1916 and included in the Report for 1917 (Table II., page 34). The earliest dates recorded by us in 1916 (May 26th to June 8th) were characterized by the presence of a certain element in the run, no trace of which occurred in any of our samples taken in 1919. This element consisted of a race of very small sockeyes, with light-coloured flesh, poor in oil, bound for spawning-grounds unknown to us. The nuclei of their scales were of small size, containing but few rings, which averaged about ten in number. Whether this race failed entirely in 1919, or whether it had already passed at the time our first sample was taken, we cannot know. It was characterized in 1916 by a very high percentage of four-year fish, which ran uniformly 88, 88, and 80 during the three days of record in which this race was running. When it gave place to another form, as shown by the sample taken June 15th of that year, the percentage of four-year fish dropped suddenly to 24, and remained near that level during the latter half of June. It is interesting to observe, in our 1919 table, that 24 per cent. of four-year fish were found in the run of June 9th.

Careful inspection of our table for 1919 shows that the run can be divided roughly into certain periods on the basis of the percentages which characterize them. Thus the latter half of July, with four-year percentages ranging from 57 to 64, stands sharply distinguished from the week of August 8th to 15th, when the percentages reached 82 to 87; and this period in turn gives way abruptly to the condition obtaining during the last ten days of August, when the percentages ran from 97 to 100. The change is not a gradual and continuous one. On the contrary, for a week or two a certain level is maintained with remarkable regularity, then, either abruptly or with one or more days of transition, a new level is reached, and again continues unmodified for a longer or shorter period. The impression received is strongly that of a succession of migration waves, differing in the relative proportions of their age-groups, the vanguard of one mingling more or less with the rear-guard of the preceding one.

That this impression is justified appears in evidence derived from another source—in the grouping of our samples on a wholly different basis, which was performed in total disregard of any considerations derived from the relative abundance of age-groups.

While passing in review under the microscope the scales of all the Fraser River samples collected in 1919, taking them up in the order of their appearance in the run, I was again struck by the remarkable series that passed in procession. A certain type of scale-structure would make its appearance on a given date, would occupy the stage for a time to the practical exclusion of any other type, and then, on another date, would rather suddenly be supplanted by a second type of structure, which was so sharply distinguished from the first form that it could not conceivably be found in company with it on any spawning-grounds. The season of 1919 was peculiar in comparison with previous years in the distinctness of these components of the run. Apparently, fewer types were represented than has been the case in other seasons, or if

represented, then by few individuals, which could not confuse the characteristics of the race which was dominant in that part of the run. Whereas during other seasons it has been a rare occurrence to find in any period of the run a race unmixed with any other and appearing homogeneous, the impression during 1919 was of a succession of such occurrences, in each of which one race strongly predominated, even if not wholly without admixture. The apparent paucity of races can only find explanation in the practical extermination of the run to certain tributaries, which even in the depleted condition of the river during the last decade have until now furnished their quota.

Dividing the run into a number of sections or periods, each of which was characterized by the predominance of a certain race, we have the following: June 9th and 17th; June 26th and July 2nd; July 15th, 20th, 25th, 28th, and 30th; August 4th, 8th, 12th, and 15th; August 21st, 24th, and 26th; August 29th and September 3rd. Examining in view of this group our previous table of percentages, a series of remarkable correspondences is shown to exist. Not only did the migration waves exhibit each its characteristic structural peculiarities, it possessed also its own distinctive proportionate representation of the age-groups. Some of the spawning districts, when these races reached them, must have found themselves populated almost exclusively by four-year fish; while in other districts a much heavier proportion of the older and larger fish were present.

Rearranging our table of percentages in accordance with this approximate racial grouping, we have the following:—

Table II.

	June 26, July 2.	July 15, 20, 25, 28, 30.	Aug. 4, 8, 12, 15.	Aug. 21, 24, 26.	Aug. 29, Sept. 3.	June 9, 17.
Per cent. four-year fish	77	65	82	96	97	31
Per cent. five-year fish	23	35	18	4	3	69

The significance of this grouping as conditioning the size and more particularly the number of nuclear rings will appear in later tables.

The succession of racial forms which appeared in the main run, either in the sea approaches to the river or in the main channel of the latter, are most readily detected by characteristics shown in the central or nuclear area of the scales. It is this area which records the growth of fry and fingerlings in fresh water, a growth which takes place in a number of lakes scattered widely through the river-basin, varying extensively in their climatic conditions and in the character and amount of food which they offer. The growth in these lakes differs materially, and the size of the yearlings, when they migrate seawards in the early spring, is an index of the favourable or unfavourable conditions under which the different lots have been nourished. The fingerling groups of smaller size will have at migration smaller scales, and these will be marked by fewer annular rings. In the adult salmon, therefore, the size of the nuclear area, which represents the entire scale of the fingerling migrant, and the number of rings which this nuclear area contains, serves as a measure of the size of the fingerling, and thus enables us to sort out the races which have differed in amount of growth during their first year. Not all races may have differed in this respect. But they frequently do so, and where this is the case an examination of the nuclear area gives data of high value.

In the following table the number of nuclear rings found on the scales of all four-year individuals are grouped according to the period of the run in which they appeared, these periods having been first determined by a general study of the succession of events within the run. It will be noted in the table that the sockeyes running during the first period were characterized by small nuclear areas in their scales and by few nuclear rings. Evidently they were nourished in some spawning district relatively unfavourable for fingerling-growth. When they left the lake to descend the Fraser to the sea, they were notably smaller than the fingerlings from other districts with which they found themselves associated.

During the second period, June 26th to July 2nd, there was no very sharp distinction from the first period. But the range of number of nuclear rings was greatly increased, and there were other minor characteristics which made it seem advisable to tabulate separately the individuals running on those dates. They obviously do not represent a transition period between

the second and third groups, for if individuals of the third group had been included it is not credible that they would have been limited to such as had the smaller nuclei. Furthermore, in other respects they did not resemble the strongly marked third group.

An interval of nearly two weeks elapsed, from July 2nd to July 15th, during which no samples were secured. During this interval an entirely new race had made its appearance and was running practically unmixed with other forms. The nucleus was large, regular, and sharply defined, recalling the characteristics of the Morris Creek and Harrison Lake form. A few individuals were present which resembled the preceding lot, having small, poorly defined nuclei, and frequently a small second year's growth during the first year at sea; but these were not at all numerous.

With August 4th, which has been considered the starting-point of a new group, another element became evident. The prevailing form of the preceding period continued to run strongly, but with it there occurred a form with small scale nucleus, less sharply set off from the sea-growth surrounding it, and with the first year of this sea-growth relatively small in amount. The resemblance was so close to the Pemberton or Birkenhead race that I entertained no doubts concerning its identity. The numbers increased from August 4th to 15th, until on the latter date there were few of the Morris Creek type remaining. This period was then a mixed one, but with the two types strongly contrasting and easily distinguished.

By August 21st the transition period has passed and only the form with small nuclei remained. An occasional individual of the previous type straggled along with the others, but even these had disappeared by August 29th.

Table III.—Nuclear Rings in Fraser River Sockeyes, Four-year Males and Females, One-year-in-lake Group, from South Shore of Vancouver Island, arranged by Dates of Capture.

Number of Rings.	Number of Individuals observed.					
	June 9, 17.	June 26, July 2.	July 15, 20, 25, 28, 30.	Aug. 4, 8, 12, 15.	Aug. 21, 24, 26.	Aug. 29, Sept. 3.
6	..	4	..	..	..	..
7	..	3	2	2	1	3
8	2	4	1	5	5	7
9	5	7	..	8	7	5
10	1	9	2	5	8	4
11	2	2	8	14	4	7
12	5	5	12	21	6	2
13	2	3	9	13	11	1
14	..	4	12	16	5	..
15	1	5	9	14	1	2
16	..	3	13	7	3	1
17	..	1	10	11	2	1
18	..	3	8	11	3	..
19	..	..	6	9	1	..
20	..	..	6	6	2	..
21	..	..	1	2	1	..
22	..	..	5	6	2	..
23	..	..	3	3	1	..
24	..	..	2	1	1	..
Average number	10.8	11.3	15.6	14.5	13.1	10.3

Table IV.—Nuclear Rings in Fraser River Sockeyes, Five-year Males and Females, One-year-in-lake Group, from South Shore of Vancouver Island, arranged by Dates of Capture.

Number of Rings.	Number of Individuals observed.			
	June 9, 17.	June 26, July 2.	July 15, 20, 25, 28, 30.	Aug. 4, 8, 12, 15.
6	1	1	1	..
7	3	1	1	..
8	4	2	3	1
9	8	1	2	2
10	9	..	2	2
11	1	1	1	1
12	4	1	2	2
13	1	1	5	1
14	1	..	6	2
15	..	1	7	5
16	..	..	4	8
17	..	..	6	3
18	..	2	7	1
19	..	..	1	1
20	..	..	1	4
21	..	..	..	1
22	..	..	..	1
23	..	..	..	..
24	..	..	..	1
Average number	9.6	11.4	14.2	15.6

Table V.—Nuclear Rings in Fraser River Sockeyes, One-year-in-lake Group, from South Shore of Vancouver Island, during Entire Season, 1919.

Number of Nuclear Rings.	Number of Individuals.	
	Four Years old.	Five Years old.
6	4	3
7	11	5
8	24	10
9	32	14
10	29	16
11	37	5
12	51	11
13	39	9
14	37	9
15	33	13
16	27	16
17	25	9
18	25	11
19	16	3
20	14	5
21	4	1
22	13	1
23	7	..
24	4	1

We include also the following two tables, in which are given for four- and for five-year individuals the lengths segregated within the period of the run in which they belonged. In general, the average length increases throughout the season, although near its close there is a noticeable falling-off, due to the disappearance or reduction in numbers of the exceptionally large individuals. All the data concerning average lengths and weights of sockeyes running during the periods we have outlined are given in Table VIII.

Table VI.—Fraser River Four-year Male Sockeyes, One Year in Lake, from Vancouver Island Traps, 1919, arranged by Dates and by Lengths.

Length in Inches.	June 9, 17.	June 26, July 2.	July 15, 20, 25, 28, 30.	Aug. 4, 8, 12, 15.	Aug. 21, 24, 26.	Aug. 29, Sept. 3.
20	..	1	1	..	..	..
20½	..	..	..	..	..	..
21	..	1	2	..	..	..
21½	1	..	..	..	..	..
22	1	3	6	1	1	..
22½	..	5	1	..	1	1
23	2	9	5	12	8	5
23½	..	7	3	9	9	6
24	2	2	19	21	8	6
24½	1	4	10	31	16	2
25	..	2	10	23	12	4
25½	..	..	..	10	2	4
26	..	..	2	3	2	5
26½	..	..	..	3	..	..
Average length	23.1	23.1	23.9	24.4	24.1	24.3

Table VII.—Fraser River Four-year Female Sockeyes, One Year in Lake, from Vancouver Island Traps, 1919, arranged by Dates and by Lengths.

Length in Inches.	June 9, 17.	June 26, July 2.	July 15, 20, 25, 28, 30.	Aug. 4, 8, 12, 15.	Aug. 21, 24, 26.	Aug. 29, Sept. 3.
20	..	..	3	..	..	..
20½	..	1	2	..	..	..
21	3	1	5	1	3	..
21½	1	2	4	..	3	..
22	3	15	8	5	13	3
22½	5	8	6	15	18	5
23	3	10	9	9	16	6
23½	..	3	7	18	12	6
24	..	3	5	14	7	1
24½	..	1	1	3	1	..
25	..	..	1	3	1	1
Average length	22.1	22.5	22.4	23.3	22.8	23.0

Table VIII.—Average Lengths and Weights of Fraser River Sockeyes, One-year-in-lake Group, from South Shore of Vancouver Island, grouped by Dates of Capture.

Dates, 1919.	Length in Inches.				Weight in Pounds.			
	Four Years old.		Five Years old.		Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
June 9, 17	23.1	22.1	26.2	24.8	4.4	4.3	6.7	5.6
June 26, July 2..	23.1	22.5	25.3	24.9	5.1	4.8	7.1	5.9
July 15, 20, 25, 28, 30	23.9	22.4	26.1	25.2	5.7	4.8	7.2	6.9
Aug. 4, 8, 12, 15	24.4	23.3	26.5*	25.4	6.5	5.6	8.0*	6.7
Aug. 21, 24, 26..	24.1	22.8	26.6*	24.5*	6.1	5.2	8.3*	6.5*
Aug. 29, Sept. 3	24.3	23.0	None	25.3*	6.4	5.1	None	5.0*

* Numbers too limited to give reliable estimates.

Another subject of interest in connection with the changes that occur in the constitution of the run during the course of the season is the relative numbers of males and females in the different portions of the run. In other river-basins we have usually found that the males precede the females to the extent of running in largest numbers at the beginning of the season, and in the same manner the five-year fish take precedence over the younger members of their tribe. The following table indicates that the above-mentioned order of precedence is not adhered to in the Fraser:—

Table IX.—Percentages of Four-year Males and Females, Fraser River Sockeyes, One-year-in-lake Type, running on Southern Shore of Vancouver Island on a Succession of Dates.

	June 9 to 17.	June 26 to July 2.	July 15 to 30.	Aug. 4 to 15.	Aug. 21 to 26.	Aug. 29 to Sept. 3.
Four-year males	32	44	54	62	44	60
Four-year females	68	56	46	38	56	40
Five-year males	56	43	60	58	33	50
Five-year females	44	57	40	42	67	50

(2.) Lengths and Weights of the One-year-in-lake Type.

During the season of 1919 material to determine the constitution of the main run was obtained from the southern shore of Vancouver Island and from Steveston, at the mouth of the Fraser. The Vancouver Island series is the most extensive, covering a succession of dates at frequent intervals from June 9th to September 3rd. The Steveston series is limited to the period of heaviest run, between July 23rd and August 14th.

In Tables X. and XI. are given the length-distributions of the one-year-in-lake group from these two localities, comprising all the material gathered during the season. The differences between the two tables are striking, especially so as regards the four-year group. The Steveston series form a symmetrical frequency curve, but wholly lack the smaller sizes, which form so large a part of the Vancouver series. From Steveston there are no four-year males less than 23½ inches long. In the Vancouver series 21 per cent. of the four-year males are below 23½ inches. The discrepancy is even more striking with the female four-year-olds, as 49 per cent. of the Vancouver material is smaller than any of the individuals examined at Steveston. There is a similar but less-marked difference in the five-year group, as will be seen on comparing the average lengths at the foot of the columns in the two tables.

Two possible explanations of these differences suggest themselves. The Vancouver series represents approximately the entire run, with early-running as well as late-running fish, while the Steveston lot are composed exclusively of late-running fish, which average larger in size, as we have already seen. But in column five of Tables VI. and VIII. of this report we find segregated the males and females of this group, which were running along the Vancouver Island shore during the same period which is covered by the Steveston material. The Vancouver males and females were larger than those running at any other date in this locality, the males averaging 24.4 inches and the females 23.3. But they were decidedly smaller than the Steveston fish running on the same dates, for in these the males averaged 25.1 and the females 24.1 inches.

Another possible explanation lies in different methods of capture in the two localities, the fishing in the Vancouver District being carried on by pound-nets of fine mesh, and in the Steveston District by gill-nets which permit the smaller sizes to escape.

Table X.—Fraser River Sockeyes from Vancouver Island Traps, Run of 1919, One Year in Lake, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
20	2	3	..	..
20½	..	3	..	..
21	3	13	..	1
21½	1	11	..	1
22	13	55	..	..
22½	10	65	..	2
23	43	65	1	..
23½	42	49	..	3
24	69	30	4	8
24½	70	6	2	11
25	54	7	18	16
25½	18	..	7	20
26	13	..	27	19
26½	4	1	11	5
27	..	..	15	2
27½	..	..	9	..
28	..	..	5	..
Total individuals	342	308	99	88
Percentages of each group	41	37	12	10
Average size in inches	24.1	22.8	26.1	25.1

Table XI.—Fraser River Sockeyes from Steveston, Run of 1919, One Year in Lake, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
20	..	..	..	..
20½	..	..	..	..
21	..	..	..	..
21½	..	..	..	..
22	..	..	..	..
22½	..	..	..	..
23	..	12	..	..
23½	9	15	..	..
24	18	24	..	..
24½	24	18	2	3
25	26	15	2	7
25½	30	2	3	9
26	23	1	5	13
26½	6	..	6	7
27	6	..	9	4
27½	..	..	5	1
28	..	..	5	1
28½	..	..	3	..
29	..	..	2	..
29½	..	..	1	..
Average length	25.1	24.1	26.9	25.9

Table XII.—Fraser River Sockeyes from Vancouver Island Traps, Run of 1919, One Year in Lake, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
3	..	1	..	..
3½	1	4	..	..
4	12	38	..	1
4½	18	72	..	3
5	43	77	1	4
5½	42	51	7	14
6	83	42	10	16
6½	54	12	16	12
7	40	8	18	18
7½	29	2	24	12
8	17	..	13	5
8½	2	..	6	3
9	1	..	2	..
9½	..	..	1	..
10	..	..	1	..
10½	..	..	1	..
Average weight	6.1	5.1	7.2	6.5

One fact that emerges clearly from the preceding tables of lengths and weights is the small size of the sockeyes of each group for the season of 1919 as compared with the previous year. In 1918 much material was obtained from traps along the Vancouver Island shore, samples being taken at short intervals throughout the season. Measurements were made by the same observer during both seasons, and the results should be open to strict comparison. The averages for the two years follow:—

Table XIII.

	Length in Inches.		Weight in Pounds.	
	1918.	1919.	1918.	1919.
Four-year males	24.9	24.1	6.5	6.1
Four-year females	23.8	22.8	5.7	5.1
Five-year males	26.3	26.1	7.5	7.2
Five-year females	25.4	25.1	6.7	6.5

Previous records show that 1918 was wholly normal in the size of the fish. Table XI., page 45, of our Report for 1915 gives average lengths for the four years from 1912 to 1915. With the exception of 1913, these years show average sizes slightly larger even than 1918. The year 1913 was recognized generally as an unfavourable season, in which salmon sizes were abnormally low. Yet the lengths of four-year males and females for 1913 were 24.5 and 23.8 inches, decidedly larger, therefore, than the fish of 1919. The latter year must now be regarded as having produced the smallest sockeyes, class by class, of which we have any record in the Fraser watershed.

(3.) The Two-years-in-lake Type.

Our previous discussion has limited itself to the one-year-in-lake type, which comprises a very high percentage of the annual runs to the Fraser. The two-years-in-lake type is of varying importance in different years. In 1916 (Report for 1917, page 51) sockeyes of this type ran numerously during the latter half of June, when they comprised from 10 to 15 per cent. of the run; they almost disappeared during July, and became again numerous after August 10th (9 to 10 per cent.). In 1919 they were conspicuously present during June and the early half of July. After July 15th only stragglers appeared until August 8th, and after this date they were wholly lacking. The percentages are as follows: June 9th, 10 per cent.; June 17th, 18 per cent.; June 26th, 16 per cent.; July 2nd, 11 per cent.; July 15th, 10 per cent. After July 15th a single individual only was observed in our material on each of the following dates: July 20th, 25th, and 30th; August 4th and 8th.

Table XIV.—Fraser River Sockeyes, Two Years in Lake, from Vancouver Island Traps, 1919, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals.			
	Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.
20	..	..	..	..
20½	..	1	..	..
21	..	2	..	..
21½	..	..	..	..
22	..	1	..	..
22½	1	4	..	1
23	1	3	..	1
23½	1	3	..	..
24	4	1	..	1
24½	4	1	..	1
25	3	..	1	..
25½	1	..	1	..
26	..	..	1	..
26½	..	..	1	..
Average length	24.2	22.7	25.8	23.5

Table XV.—Fraser River Sockeyes, Two Years in Lake, from Vancouver Island Traps, 1919, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals.			
	Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.
3	..	..	..	..
3½	..	1	..	..
4	2	4	..	..
4½	..	6	..	1
5	1	3	..	1
5½	5	2	..	1
6	4	..	2	1
6½	2	..	..	..
7	..	..	2	..
7½	1	..	..	..
Average weight	5.7	4.5	6.5	5.3

(4.) The Sea-type.

The only remaining group of Fraser River sockeyes are those which proceed to sea shortly after hatching, instead of remaining for one or more years in fresh water. We have designated this the "sea-type," since practically the entire life is spent in the ocean. The omission of the year in the lake hastens the development and maturity by one year. Instead of maturing at the age of four and five, as in the case of the one-year-in-lake type, sea-type individuals mature at the age of three and four. The four-year class is usually more numerously represented than the three-year group, and the latter often contains a disproportionate representation of males, while the four-year group contains a corresponding excess of females. But in 1919 the three-year individuals of this group outnumbered the four-year class, and it consisted of males and females in about equal numbers.

In our Report for 1917 (page 50) and for 1918 (page 30) we have discussed the appearance of sea-type individuals in different parts of the run, and have shown that they are largely confined to the period between the middle of July and the middle of August, being most numerous during the first week in August. The earliest date on which any were observed in 1916 was July 17th, and in 1918 on July 14th. In 1919 one three-year individual appeared June 9th, and this must be considered a highly exceptional occurrence. None others were included in our collections of June 17th and 26th, nor on July 2nd. One was found among fifty other specimens on July 15th, which is the regular time for them to appear, and they were present throughout the remainder of July and during all of August, being most numerously represented in our collections of July 30th and August 4th. The sea-type appeared in larger numbers during 1919 than in other recent years, the percentages of their occurrence being as follows:—

	Per Cent.		Per Cent.
June 9	2	Aug. 8	6
July 15	2	„ 12	6
„ 20	6	„ 15	6
„ 25	8	„ 24	2
„ 28	12	„ 26	3
„ 30	16	„ 29	2
Aug. 4	15		

The only spawning-grounds for the sea-type sockeyes known to us within the Fraser basin are found in a slack-water stretch of the Harrison River below Harrison Lake and a short distance below the mouth of Morris Creek. No lake exists below these spawning-beds, either in the Harrison or in the Fraser River.

Table XVI.—Fraser River Sockeyes, "Sea-type," Vancouver Island Traps, 1919, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals.			
	Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.
20	..	..	..	..
20½	1	1	..	..
21	1	2	..	..
21½	2	3	..	..
22	1	4	..	..
22½	3	1	..	..
23	4	1	..	1
23½	..	..	..	2
24	1	1	2	4
24½	1	..	..	2
25	1	..	..	2
25½	..	..	..	2
26	..	1	2	..
26½	..	..	..	..
27	..	..	..	..
27½	..	..	..	..
Average length	22.6	22.2	25.0	24.3

Table XVII.—Fraser River Sockeyes, "Sea-type," Vancouver Island Traps, 1919, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals.			
	Three Years old.		Four Years old.	
	Males.	Females.	Males.	Females.
3	..	1	..	..
3½	1	1	..	..
4	1	2	..	..
4½	3	6	..	1
5	3	1	..	..
5½	2	1	1	4
6	3	2	1	2
6½	..	..	..	2
7	1	..	..	4
7½	1	..	1	..
8	..	..	1	..
Average weight	5.3	4.8	6.8	6.1

(5.) The Fraser River Canyon.

An interesting collection of scales with data concerning sex and length of the individuals was made in the canyon of the Fraser River at Hell's Gate during the first half of August and on September 25th and 26th. Inasmuch as undoubted changes occurred in the constitution of the run within that period, we have divided the material by date of capture into three groups: the first extending from August 1st to the 11th; the second from the 12th to the 17th; and the third including the September fish. No doubt could exist concerning the distinctness of the latter group. As shown in Table XVIII., the nuclear areas of their scales were larger and were furnished with more numerous rings than was the case with the August fish. If the run to Seton Lake and the Quesnel had not been practically exterminated, I should have considered seriously the possibility that they were bound for one or both of those tributaries. They were certainly not headed for the Chilcotin. On the other hand, the August run presented all the characteristics of Chilcotin fish.

Table XVIII.—Nuclear Rings in Sockeyes from Fraser River Canyon at Hell's Gate, One-year-in-lake Group, Age undetermined, arranged by Dates of Capture.

Number of Nuclear Rings.	Number of Individuals observed.		
	Aug. 1 to 11.	Aug. 12 to 17.	Sept. 25, 26.
7	6	3	..
8	10	4	1
9	9	4	1
10	5	3	2
11	8	4	2
12	7	3	7
13	4	2	8
14	..	2	12
15	..	2	11
16	..	1	8
17	..	..	3
18	..	1	..
19	..	..	3
Average number	9.7	10.9	14.1

Table XIX.—Sockeyes from Fraser River Canyon at Hell's Gate, 1919, grouped by Date, Length, and Sex (Age undetermined).

Length in Inches.	Number of Individuals observed.					
	Aug. 1 to 11.		Aug. 12 to 17.		Sept. 25 and 26.	
	Males.	Females.	Males.	Females.	Males.	Females.
19½	..	..	..	..	..	1
20	..	..	..	..	..	1
20½	..	..	..	..	..	..
21	..	2	..	..	..	..
21½	..	2	..	..	1	..
22	..	5	..	5	..	2
22½	..	7	..	5	..	5
23	..	1	3	2	..	20
23½	..	1	2	1	1	9
24	2	3	3	2	3	4
24½	..	..	1	..	2	..
25	..	..	..	..	2	..
25½	..	1	..	..	4	..
26	..	..	..	..	1	..
26½	..	2	1	..	2	..
27	..	1	..	..	1	..
27½	..	..	..	..	..	..
28	..	..	..	..	1	..
Average length	24.0	23.1	23.9	22.8	25.1	22.9

(6.) The Cultus Lake Race.

The run to Cultus Lake appears to have been larger than usual during the season of 1919. Certain it is that the size of the individual fish was far larger than we have observed it in previous years. The Cultus Lake race has been counted one of the most diminutive in the Fraser basin. The tables of measurements given on pages 47 and 48 of our Report for 1917 show this distinctly. But in 1919, as indicated in Table XX., which follows, the males especially were among the largest fish of which we have record during this year. Comparing Table XX. with Table X. of this report, it will be seen that the Cultus Lake males range in length very closely with the five-year fish from the Fraser basin. We have no means of determining the age of the Cultus Lake specimens, as the scales are too seriously eroded. But we have doubtless represented in Table XX. both four- and five-year individuals, with the five-year-olds, perhaps, quite largely in excess. It may be that in 1916 the smaller size depended on the practical absence of five-year fish.

Table XX.—Fraser River Sockeyes, Run of 1919, from Cultus Lake Spawning-grounds, grouped by Length and Sex (Age undetermined).

Length in Inches.	Number of Individuals.	
	Males.	Females.
21	..	1
22	..	20
23	2	77
24	19	49
25	58	5
26	58	1
27	12	..
28	1	..
Average length	25.4	23.3

Table XXI.—Number of Nuclear Rings on Scales of Fraser River Sockeyes from the Cultus Lake Spawning-grounds, 1919.

Nuclear rings	7	8	9	10	11	12	13	14	15	16	17	18
Individuals	2	6	7	9	9	12	4	6	3	2	2	1

Average, 11.5.

(7.) FINGERLING MIGRANTS IN THE QUESNEL.

A valuable series of migrating fingerlings was obtained in the outlet to Quesnel Lake from April 19th to May 16th, 1919. Much credit is due to Fisheries Overseer A. W. Stone for the efficient manner in which he performed the difficult task of securing this material.

Two hundred and fifty-seven specimens were obtained. Five of these, taken in April, were fry of the year, ranging from 26 to 35 mm. (1 to 1.3 inches) in length, and in none of these were any traces of the scales to be found. Had they survived, scales would have developed after reaching the sea, and would have represented in their markings the method of growth characteristic of sea-life. But as we have failed to detect above the Fraser River Canyon any adult sockeyes which had gone down to the sea as fry, we are compelled to assume that practically all up-river fry which migrate at this diminutive size perish early.

The remainder of the Quesnel specimens are fingerlings which have completed their first year and are descending the river in their second spring. When these should reach maturity the minute scales with which they are now covered would constitute the centres or nuclei of the adult scales. The size of the adult nucleus will be precisely the size of the present scale, and the fine rings with which the fingerling-scales are marked will be unaltered in number and character during subsequent growth of the scale in salt water. Fingerlings of this character, when they return to the river at maturity, constitute the one-year-in-lake type, which always predominates in the Fraser River drainage.

Males and females were in about equal numbers throughout the month when the collections were being made. The total numbers are 122 males and 130 females. The males range in length from 66 to 105 mm., with the average at 87 mm. Females range from 70 to 101 mm., with the average at 87.4 mm. This difference is too slight to possess any significance. We are justified in stating that at this time males and female fingerlings were in equal numbers and of equal average size.

An interesting comparison is now possible between the 1919 migrants and those obtained in 1915. An account of the latter is found in our Report for 1915, page 39. In 180 specimens examined in 1915 61 per cent. were males, while in 1919 only 48 per cent. were males. The average size is almost identical, the range in both sexes in 1915 being from 74 to 114 mm., the males averaging 89.5 and the females 87.7 mm. During two years, then, which were four years apart, Quesnel Lake produced two schools of fingerlings of identical size.

In other respects, also, complete agreement was found in the product of these two years. No fingerlings of the two-year type were present in either lot, while a limited number were found in 1915 among fingerlings from an adjacent tributary, the Chilcotin. But it will be recalled that Chilcotin adults often include a considerable percentage of individuals of the two-year-in-lake type. We have unfortunately no adequate data from adults running in the Quesnel. We have attempted to obtain such data, but the run to the Quesnel is now nearly extinct.

Another respect in which Quesnel fingerlings of 1915 and 1919 stand in agreement is in their failure to initiate the new growth of the year prior to migrating. Doubtfully, in a few individuals in 1919, the outer ring on the scale showed a slightly widened interval separating it from the preceding ring, and possibly indicating a renewal of growth. In 1915 some 5 per cent. of the Quesnel fingerlings showed traces of growth, while in the Chilcotin migrants of the same year more than 50 per cent. had begun the new growth of the season when they were captured.

The Quesnel fingerlings obtained in 1915 and 1919 agree closely in another very important respect. The number of rings on the scales—and these will constitute the nuclear rings of the adult scale—were alike in their range and in their average. The range in 1915 was from 10 to 22, with the average at 14.6. The range in 1919 is from 9 to 19, with the average at 14.9. No two lots during the same year could be expected to show more complete agreement than do these two series taken four years apart.

The following tables give the length-distribution of males and females and the number of scale-rings for both sexes:—

Table XXII.—Lengths of Quesnel Migrant Fingerlings in 1919.

Length in Millimetres.	Males.	Females.	Length in Millimetres.	Males.	Females.
66	1	..	86	9	9
70	1	2	87	7	7
71	1	..	88	5	12
72	1	1	89	8	12
73	..	1	90	9	6
74	1	..	91	11	1
75	1	1	92	4	7
76	4	2	93	2	7
77	1	1	94	3	6
78	1	3	95	6	7
79	3	1	96	3	3
80	2	3	97	3	1
81	6	2	98	2	2
82	3	8	99	3	..
83	12	7	101	..	3
84	4	6			
85	4	9	Average length	87	87.4

Table XXIII.—Scale-rings of Quesnel Lake Yearling Fingerlings, 1919.

Number of rings	9	10	11	12	13	14	15	16	17	18	19
Number of individuals	1	2	3	8	15	28	27	31	18	9	2

Average rings, 14.9.

In order to ascertain whether any changes occurred in average size of fingerlings during the month in which the migration was under observation, we have divided this period as follows:—

Table XXIV.—Average Lengths of Quesnel Lake Migrant Fingerlings on a Succession of Dates, 1919.

Dates, 1919.	Length in Millimetres.		
	Males.	Females.	
April 19th to 23rd	87.5	84.3	(Average scale-rings, 14.2).
April 24th to May 2nd	87.4	87.7	(Average scale-rings, 14.8).
May 5th and 6th	88.5	89.1	(Average scale-rings, 15.1).
May 7th to 16th	82.9	84.1	(Average scale-rings, 13.6).

There is a slight but progressive increase in size from the beginning of the migration to April 5th and 6th, when it was at its height. Then at the latter end of the migration smaller sizes prevail, and the average drops sharply to below the level of the initial stages of the run. The scale-rings follow the size and are a delicate index of it.

Table XXV.—Number of Scale-rings in Quesnel Lake Yearlings, grouped according to Lengths of Individuals.

Length in Millimetres.	Number of Scale-rings.												Average No. of Rings.
	9.	10.	11.	12.	13.	14.	15.	16.	17.	18.	19.	20.	
60 to 69	1	..	..	..	..	..	..	..	..	..	..	..	9.0
70 to 79	1	4	7	8	6	..	1	..	..	..	..	..	11.7
80 to 89	..	..	1	8	21	34	20	13	3	1	..	..	14.3
90 to 99	..	..	..	..	..	4	13	25	18	6	2	1	16.1
100 to 109	..	..	..	..	..	..	..	..	..	2	..	..	18.0

Note.—This table may be compared with a similar table in our Report for 1915, Table XXI., page 40.

II. THE RIVERS INLET SOCKEYE RUN OF 1919.

The Rivers Inlet sockeye run of 1919 produced a pack of only 56,258 cases and was no improvement over the three very poor years which preceded it. The average for the four years, 1916 to 1919, is 53,948 cases. For comparison we divide the history of the Rivers Inlet District into successive four-year periods, and present below the average sockeye-pack for each of these periods:—

1904 to 1907, average pack of 98,589 cases.
1908 to 1911, „ „ 99,142 „
1912 to 1915, „ „ 98,717 „
1916 to 1919, „ „ 53,948 „

The present situation is fast developing into one of pronounced danger. The productivity of the river has fallen during the past four years to little more than half its previous magnitude. We are no longer justified in classing the recent poor years with those occasional fluctuations which have occurred in previous cycles. Such fluctuations have been exceptional occurrences and have been preceded and followed by runs of normal size. Thus the pack of 64,352 cases in 1908 was associated with packs of 87,874 and of 89,027 cases, and the phenomenally poor record of 1913 (61,745 cases) was preceded by 112,884 and followed by 89,890 cases. The averages for the four-year periods permit no doubt on this score. But the present condition of the Rivers Inlet sockeye run properly gives cause for serious uneasiness. Unless the intensity of the fishing is at once diminished, unless we decrease the total number of sockeyes taken annually from this watershed, we are in danger of repeating here on a smaller scale the tragic history of the Fraser River.

(1.) The Age-groups.

The Rivers Inlet run of 1919 was composed almost exclusively of two age-groups, which had had the same early history during their single year's residence in their native lake, and differed only in the number of years they had spent in the sea before becoming mature. Both of these groups spent something more than a year in fresh water, and migrated seawards as fingerlings in the spring of their second year. One group became mature and sought its spawning-grounds during its third summer in the sea, while in the fourth year of its age. The other group delayed its spawning until in its fifth year.

The four- and five-year fish with the above history always constitute the great majority of the Rivers Inlet run. An occasional individual is found which remained as fingerling two years in fresh water before migrating. Three such individuals were included in our 1919 material, all of them captured on July 7th. Each of these had remained over three years feeding at sea, and re-entered the Owikeno River when in its sixth year.

Another type, always sparsely represented in this basin, passes to sea immediately on the absorption of the yolk, and thus has practically its entire history in the sea. One individual of this class was taken July 10th, having returned to spawn in its fourth year.

The two principal classes, four- and five-year fish that spent one year in the lake after hatching, are present during different years in widely varying proportions at Rivers Inlet. We have determined these proportions for the runs of the last eight years, from 1912 to 1919, during which time the four-year age-group has varied from 13 to 80 per cent. of the whole. But the five-year group is nearly always in the majority in this river-basin, the average for the eight

years being 39 per cent. belonging to the four-year class and 61 per cent. to the five-year group. A tendency was early apparent toward an increase in the relative numbers of five-year fish during the seasons of the largest runs. Thus in 1912, when the season's pack amounted to 112,884 cases, there were 21 per cent. four-year-olds and 79 per cent. five-year-olds; and in 1915, with a pack of 130,350 cases, the corresponding percentages were 13 and 87. These are the two years with largest packs since our investigations began, and it is noteworthy that they also have the largest percentages of five-year fish. And while this rule does not hold rigidly and presents some marked exceptions, it is yet true that the three lowest percentages of five-year fish, 20, 43, and 54 per cent., occurred during 1913, 1918, and 1919, three of the poorest seasons of which we have record.

In the following table we give the percentages of four-year and of five-year sockeyes for each of the eight years during which the Rivers Inlet runs have been examined. In the right-hand column are indicated for each season the two brood-years, one of which produced the four-year and the other the five-year fish of that year. Thus in 1919 the five-year fish had been hatched from eggs deposited in 1914; and in 1914 the run appears to have been of normal size, inasmuch as it produced a pack of 89,890 cases. Similarly, the four-year fish, running in 1919, had developed from eggs laid down in the fall of 1915, a year notable as having furnished the largest pack (130,350 cases) known in the Rivers Inlet District. We see from this that the antecedents of the 1919 run were in appearance highly favourable, and if such evidence could be depended on as a basis for prediction, we should have been justified in anticipating more than an average pack in 1919. But it is clear from the failure of 1919, and from other similar occurrences indicated in the following table, that evidence of this nature has thus far been wholly unreliable in Rivers Inlet. We now know that we cannot form any estimate of the probable size of the run in 1920, although we know that the four-year fish will be descendents of the run of 1916 (44,936 cases), and the five-year fish will be derived from the run of 1915 (130,350 cases). We are not even certain that these facts will give us reliable indication concerning the relative proportions of four-year and five-year fish which will be observed during the season of 1920. But the results during 1920 will possess more than usual interest, for in the two brood-years of that season we find contrasted, as above indicated, the very poorest and the very richest years of which we have record. It will be most interesting to observe whether the five-year age-group will appear in 1920 in overwhelming proportions.

Table XXVI.—Percentages of Four- and Five-year Rivers Inlet Sockeyes in Runs from 1912 to 1919, with the Broods from which they were derived.

Run of the Year.	Percentage. Four and Five Years old.	Brood-year from which derived.
1912 (112,884 cases)	5 yrs. 79%	1907 (87,874 cases).
	4 yrs. 21%	1908 (64,652 cases).
1913 (61,745 cases)	5 yrs. 20%	1908 (64,652 cases).
	4 yrs. 80%	1909 (89,027 cases).
1914 (89,890 cases)	5 yrs. 65%	1909 (89,027 cases).
	4 yrs. 35%	1910 (126,921 cases).
1915 (130,350 cases)	5 yrs. 87%	1910 (126,921 cases).
	4 yrs. 13%	1911 (88,763 cases).
1916 (44,936 cases)	5 yrs. 76%	1911 (88,763 cases).
	4 yrs. 24%	1912 (112,884 cases).
1917 (61,195 cases)	5 yrs. 67%	1912 (112,884 cases).
	4 yrs. 33%	1913 (61,745 cases).
*1918 (53,401 cases)	5 yrs. 43%	1913 (61,745 cases).
	4 yrs. 57%	1914 (89,890 cases).
1919 (56,258 cases)	5 yrs. 54%	1914 (89,890 cases).
	4 yrs. 46%	1915 (130,350 cases).

* The relative proportions of four- and five-year fish for the year 1918 were by accident reversed in our previous report. The correction is here made.

In previous reports we have pointed out that the relative sizes of the four-year group and the five-year group are not constant throughout any season, but vary widely when a succession of samples are taken on different days during the run. This variation is ordinarily not a chance, haphazard affair, but proceeds in orderly sequence throughout the season. In 1915 (*see* Report for 1915, page 42) the five-year group was smallest at the beginning of the season and increased regularly in a succession of dates from 79 to 94 per cent. In 1916 and 1917 (Report for 1917, pages 58 and 68) the sequence of events was the reverse of the above. The five-year group in each of these years appeared in greatest relative numbers at the opening of the season, the percentages decreasing in a series of dates rather uniformly from 93 or 94 at the beginning to 53 or 44 at the close. In 1918 (Report, page 43) another complete reversal occurs. The five-year group was almost absent at the opening of the season, increased from 7 to nearly 70 per cent. near the middle of the run, and then declined slightly towards the end. Similar data for the year 1919 are given in the following table:—

Table XXVII.—Percentages of Five-year Rivers Inlet Sockeyes occurring at Different Dates in the 1919 Run.

Dates, 1919.	Percentages of Five-year Fish.	Number of Specimens examined.
July 7	65	71
„ 10	47	74
„ 15	66	74
„ 18	67	75
„ 22	52	75
„ 26	55	75
„ 31	55	75
Aug. 2	32	74

The year 1918 was signalized in a previous report as highly exceptional in its age-groups. It had not only the lowest average percentage of five-year fish observed since 1913, but the sequence of events with regard to this group was the reverse of what had been observed in 1916 and 1917. A comparison with 1919 is of special interest, as during this year also the percentage of five-year fish was extraordinarily low. The early records are unfortunately lacking for 1919, so we have no knowledge whether, as in 1918, the five-year group was markedly deficient at the beginning of the run. The data for the two years are combined in the following table and may be directly compared. It is evident that they were strikingly similar.

Table XXVIII.—Comparison of 1918 and 1919 in the Percentages of Five-year Sockeyes appearing at Different Dates.

Date.	1918.	1919.
June 27	7	..
„ 29	19	..
July 2	25	..
„ 4	32	..
„ 7	..	65
„ 10	37	47
„ 12	64	..
„ 15	..	66
„ 16	59	..
„ 18	..	67
„ 19	69	..
„ 22	..	52
„ 23	44	..
„ 26	59	55
„ 30	54	..
„ 31	..	55
Aug. 2	..	32

(2.) DISTRIBUTION OF THE SEXES.

The year 1919 furnished no exception to the rule at Rivers Inlet, according to which four-year males are greatly in excess of the four-year females, while the conditions are reversed in the five-year group. A striking agreement in these proportions for the last four years is shown in the following table. The four-year males are about three times as numerous as the four-year females, and the five-year females half again as numerous as the five-year males. Usually the total males in the run are in excess of the females, and this was notably true in 1918. But in 1919 the females were slightly more abundant.

Table XXIX.—Average Percentages of Males and Females, Rivers Inlet Sockeye, throughout the Seasons from 1916 to 1919.

Year.	Four Years old.		Five Years old.		Total	Total
	Males.	Females.	Males.	Females.	Males.	Females.
1916	74	26	40	60	52	48
1917	75	25	42	58	53	47
1918	74	26	49	51	66	34
1919	77	23	41	59	49	51

We have shown in the above table that the average proportions of the sexes in each of the two year-groups are fairly constant during a series of years. But that is true only of the average for each season. The proportions for different parts of the same season vary widely. As a rule, males are relatively most abundant in the early part of the run and decrease with some regularity as the season advances. This is equally true in the case of the four-year males, which compose the greater part of their age-group, and of the five-year males, where the reverse is the case.

Thus in 1915 the four-year males decreased from 76 per cent. of their group at the opening of the season to 60 per cent. at the close; while the five-year males during the same period decreased from 53 to 24 per cent. of the total five-year fish. A similar sequence of events was recorded in 1916 and 1917, the four-year males decreasing from 100 per cent. at the beginning to 61 and 56 per cent. at the close; and the five-year males from 67 and 59 per cent. in the early season to 23 and 19 per cent. at the end. The year 1918, exceptional in so many respects, was unusual also in the appearance of the sexes. Both four-year and five-year males exhibited relative increase toward the middle of the season, to be followed by the usual reduction toward the latter end of the run.

The following table shows again a marked similarity between 1918 and 1919 in their exceptional features. In 1919 the maximum number of four-year males was not reached until past the middle of July, beyond which point there was a rapid decline. The five-year males show less regularity in their occurrence, but the maximum percentage recorded was on July 15th, whence there was a consistent decrease until July 31st, to be followed by a spasmodic increase on the last date of record, August 2nd. The four-year males also showed an increased percentage August 2nd, after having reached their lowest ebb on July 31st.

Table XXX.—Percentages of Males and Females in Rivers Inlet Sockeyes occurring on Different Dates, Season of 1919.

	July 7.	July 10.	July 15.	July 18.	July 22.	July 26.	July 31.	Aug. 2.
Four-year males	84	82	88	100	92	76	53	58
Four-year females	16	18	12	..	8	24	47	42
Five-year males	48	43	55	42	42	39	20	71
Five-year females	52	57	45	58	58	61	80	29

(3.) Lengths and Weights.

The tables which follow give the length and weight distribution of all the individuals examined, grouped by age and by sex. As in similar tables, prepared for previous years, it appears that the females average smaller than the males of their own age and exhibit a narrower range of variation. Thus, although the females average less in size, a few of the males of the same age are smaller than any of the females, while some, of course, are larger.

The five-year always average larger than the four-year fish, but the overlapping is considerable. On the table of lengths the overlap includes slightly more than half the range in size for each age. All the individuals examined during the season of 1919 which were less than 22 inches long were four years old, and all in excess of 25 inches were five years old. The relative proportions of four- and of five-year fish observed within the scope of the overlap—that is, from 22 to 25 inches long—is shown below:—

Table XXXI.

Length in Inches.	Proportion.	
	Four Years old.	Five Years old.
	Per Cent.	Per Cent.
22	98	2
22½	86	14
23	65	35
23½	34	66
24	19	81
24½	5	95
25	8	92

Table XXXII.—Rivers Inlet Sockeyes, Run of 1919, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
19½	1	..	..	..
20	3	..	..	..
20½	8	1	..	..
21	18	1	..	..
21½	29	14	..	..
22	38	15	1	..
22½	39	17	6	3
23	35	10	9	15
23½	22	3	17	31
24	12	1	16	38
24½	3	..	14	38
25	3	1	16	33
25½	..	..	14	15
26	..	..	14	8
26½	..	..	14	6
27	..	..	5	2
27½	..	..	3	..
28	..	..	1	..

Table XXXIII.—Rivers Inlet Sockeye, Run of 1919, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
3	1	..	..	..
3½	1	1	..	..
4	25	8	..	..
4½	64	25	4	2
5	52	17	12	30
5½	32	6	19	44
6	12	2	20	34
6½	2	..	16	32
7	1	..	18	16
7½	..	..	9	4
8	..	..	7	2
8½	..	..	2	..
9	..	..	1	1

The average size of Rivers Inlet sockeyes within their own group was so nearly constant during the first years of our investigation that any considerable change in this respect becomes immediately apparent. Such a change has undoubtedly accompanied the reduction in the size of the runs during the last three years. We have no present reason to allege in support of an assumption that there is a casual connection between the size of the individual fish and the magnitude of the run. The coincidences during the last three years may be only chance associations. But against this hypothesis we have our observations of other exceptionally poor runs in the rivers of the Province during the years 1913 and 1917, when, as stated in our Report for 1917 (page 77), "We have extremely poor packs of sockeyes in all the large rivers of the Province, and we have these poor runs consisting everywhere of undersized fish."

This is a subject which will well repay further investigation. At present we are without any explanation for the extensive annual fluctuations in the size of the runs in our principal salmon-streams. Neither in the Nass, the Skeena, nor in Rivers Inlet have we been able to establish any relation between the size of the run in any given year and the size of the broods from which it has been derived. How can we explain this lack of relation between the two? We may contend, of course, that the apparent lack of relation is due to incorrect estimates of the size of the runs during some or all of the seasons. Our estimates are based on the apparent abundance of the fish and the size of the commercial catches. Failures by this method, due to exceptional conditions, may indeed occur now and then. But quite generally it has been noted that seasons of good fishing correspond with successful seasons on the spawning-grounds, as these are established by direct observation. So while we may admit occasional lapses by our method, we must agree that years of apparent abundance are correctly so characterized and correspond with seasons in which the spawning-beds are abundantly seeded.

Are we then forced to the conclusion that the relative amount of seeding of the beds has comparatively little influence on the size of the resulting runs? Such a conclusion becomes palpably absurd if pressed to the limit. If the number of eggs be sufficiently reduced, no one can deny that this will have a paramount influence on the magnitude of the run. But when the variation in the annual production of eggs is of lesser amount, no greater in fact than has occurred in the Nass, the Skeena, and on Rivers Inlet in the last ten years, we must now, in view of all the facts, contemplate the possibility that other factors which limit the production of salmon are of greater importance than egg production, within the normal limits of the variation of the latter, and have a dominating influence in producing the annual fluctuations so evident in the salmon-supply, even in the case of those streams which are not overfished.

Where overfishing has occurred, obviously the case would be different. This is apparent from the very definition of the term. By overfishing we mean so great a reduction of the spawning stock that insufficient eggs are produced year by year to maintain the run at its maximum productivity. In pronounced cases of this kind a correlation may well be established

between egg production in a given year and the size of the resulting run. Such correlation has been repeatedly demonstrated during the decline of the great Fraser River fishery.

Our failure to find such correlation in the Nass, the Skeena, and in Rivers Inlet possibly may be due to the fact that these streams, during the period when those broods have been produced whose progeny we have later examined, have not been seriously overfished. It may be that even during their poorer years there was approximately adequate egg production, while during some of their better years there may have been even useless excess of eggs. The fluctuations in the size of the runs would then be due to other causes than the annual variations in the number of spawning fish. Conceivably, the poor runs may be due to unfavourable conditions during the growing period in fresh water or in the sea—unfavourable conditions which would cause widespread mortality and a stunting of the remnant of the brood. Any evidence, then, of habitual or frequent stunting during years of diminished supply will throw much-needed light on this question.

Obviously, the occurrence of undersized fish characterizing each of a series of conspicuously poor years does not exclude the possibility of overfishing as a contributory cause for the decreased runs. When the experience of a series of years indicates unmistakably that the productivity of a stream is declining to a lower level, the common-sense treatment of the situation is to modify favourably the only factor over which we exercise control. We should increase the spawning reserve and thus seek to augment the egg production. Egg production must, after all, be fundamentally most important. As a constant factor, in the long run it will dominate the situation.

Undoubted evidence in this direction is furnished by the runs of the last three years in Rivers Inlet. Both males and females of four- and five-year fish show corresponding decreases in both length and weight. Prior to 1917, we could state that the lengths of four-year males averaged 22.9 inches, with such inconsiderable variations in successive years that these might well be attributed to imperfections of our method. In similar manner, the four-year females averaged 22.8 inches, the five-year males 25.9 inches and the five-year females 25.1 inches. But the averages for 1917, 1918, and 1919 have been for four-year fish 22.4 and 22.3 inches, and for five-year fish 24.9 and 24.4 inches. In similar manner, the average weights preceding 1917 were for four-year fish 5.4 and 5.1 pounds, and for five-year fish 7.4 and 6.7 pounds; while during 1917, 1918, and 1919 the averages have been for four-year fish 4.9 and 4.9 pounds, and for five-year fish 6.5 and 6.3 pounds. The data for the last eight years are given in the following table:—

Table XXXIV.—Average Length in Inches of Rivers Inlet Sockeyes for Eight Successive Years.

	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Four-year males	23.2	22.9	23.0	22.9	22.9	22.5	22.3	22.4
Four-year females	22.8	23.0	22.8	22.8	22.8	22.3	22.5	22.3
Five-year males	25.8	25.9	25.9	26.0	25.8	25.0	24.9	24.8
Five-year females	24.6	25.2	25.2	25.1	25.0	24.4	24.5	24.4

Table XXXV.—Average Weight in Pounds of Rivers Inlet Sockeyes for Six Successive Years.

	1914.	1915.	1916.	1917.	1918.	1919.
Four-year males	5.4	5.3	5.5	5.0	4.9	4.9
Four-year females	5.2	5.1	5.0	4.9	5.1	4.8
Five-year males	7.3	7.3	7.6	6.6	6.7	6.3
Five-year females	6.8	6.6	6.7	6.2	6.7	5.9

The fishing season at Rivers Inlet lasts for about six weeks, and this is practically coextensive with the run, as is shown by the very limited boat-catches at the beginning and at the end of the season. The latest fish to appear may well have had six weeks longer in which to feed and grow than have those which were first to arrive. A comparison of the average sizes in each group is given below for a series of dates. The number of individuals in our samples was too limited to furnish wholly reliable results, especially in the four-year

females and the five-year males, which on certain dates were present in very small numbers. But in each of the groups a small but unmistakable growth is evidenced during the season until at the latter end, when the average size in all groups again diminishes.

Table XXXVI.—Average Lengths and Weights of Rivers Inlet Sockeyes on a Succession of Dates.

	Length in Inches.				Weight in Pounds.			
	Four Years old.		Five Years old.		Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
July 7, 10	21.9	22.0	24.3	24.5	4.6	4.6	5.6	5.9
„ 15, 18	22.4	22.3	24.9	24.6	5.0	4.7	6.4	6.1
„ 22, 26	22.6	22.7	25.0	24.8	4.9	5.1	6.7	6.2
„ 31	22.9	22.6	25.3	24.0	5.1	4.8	6.3	5.7
Aug. 2	22.4	21.9	24.3	23.7	4.8	4.5	5.7	5.3

III. THE SKEENA RIVER SOCKEYE RUN OF 1919.

(1.) General Characteristics and the Age-groups.

The commercial take of sockeye salmon in the Skeena River in 1919 amounted to 184,945 cases, and was the next to the largest known in the history of the river. It was exceeded only by the take in 1910, which reached the total of 187,246 cases. The occurrence of two favourable seasons in succession, those of 1918 and 1919, bring a certain amount of needed reassurance concerning the general condition of the salmon-supply in the Skeena River. The previous occurrence of two extremely poor years in succession, 1916 and 1917, had been occasion for grave forebodings, lest they might indicate that the salmon-supply of this river was being drawn on more heavily than in the long run would prove safe. This question has not yet received a conclusive answer. Annual fluctuations often conceal the sequence of events. Only by resorting to averages which cover periods of years can we ascertain with some degree of certainty whether the supply is on the whole diminishing. With this object in view we have ascertained the average pack on the Skeena River in four-year cycles from 1903 until 1919.

Average pack from 1903 to 1906..... 78,868 cases.
„ „ 1907 to 1910..... 130,851 „
„ „ 1911 to 1914..... 101,664 „
„ „ 1915 to 1919..... 91,477 „

Considering these averages in connection with the fact that the number of canneries and the amount of fishing-gear employed in this district have been relatively constant during the greater part of the period under consideration, and the further fact that latterly the high price obtained by the fishermen has encouraged them to make every effort, we cannot escape apprehension that we are slowly but certainly encroaching on our capital supply of fish. It would seem that, on the average, the productivity of the river is declining. Until this question has received a satisfactory decision the situation on the Skeena should receive most careful and conservative treatment. The intensity of the fishing should be diminished and not increased.

We have elsewhere called attention to the insuperable difficulties we have encountered in attempting to correlate seasons of scanty supply with poor brood-years from which they had been derived. We are unable to establish any relation between the two. No basis for prediction as to the size of the pack in any given year can be found in the apparent size of the runs four and five years before, yet practically all the individuals which will comprise the run will have developed from eggs deposited in those two seasons. Our estimate of the relative abundance of fish during the brood-years is based on the number of cases packed during those years. While this method is not strictly accurate, there is no reason to be alleged why in general it should not furnish reliable data. We have reason to believe that, on the average, commercially successful years are characterized by a relatively large number of salmon escaping to the spawning-grounds and by a relatively large deposition of eggs. That increased egg production should not result in recognizably larger runs under such conditions as have obtained in the Skeena River basin is a conclusion that has been forced on us by such evidence as is presented in the following table:—

Table XXXVII.—Percentages of Four- and Five-year Skeena River Sockeyes that spent One Year in Lake, in Runs of Successive Years.

Run of the Year.	Percentage. Four and Five Years old.	Brood-year from which derived.
1912 (92,498 cases)	5 yrs. 43%	1907 (108,413 cases).
	4 yrs. 57%	1908 (139,846 cases).
1913 (52,927 cases)	5 yrs. 50%	
	4 yrs. 50%	1909 (87,901 cases).
1914 (130,166 cases)	5 yrs. 75%	
	4 yrs. 25%	1910 (187,246 cases).
1915 (116,553 cases)	5 yrs. 64%	
	4 yrs. 36%	1911 (131,066 cases).
1916 (60,923 cases)	5 yrs. 60%	
	4 yrs. 40%	1912 (92,498 cases).
1917 (65,760 cases)	5 yrs. 62%	
	4 yrs. 38%	1913 (52,927 cases).
1918 (123,322 cases)	5 yrs. 59%	
	4 yrs. 41%	1914 (130,166 cases).
1919 (184,945 cases)	5 yrs. 69%	
	4 yrs. 31%	1915 (116,553 cases).

As we have shown on previous pages in connection with Rivers Inlet, there is also in the Skeena an apparent relation between the size of the run in any year and the proportion of five-year fish of which it is partially composed. In general, but with many exceptions, the larger the run, the greater the preponderance of five-year over four-year fish. Arranging the eight years from 1912 to 1919 of the preceding table in the order of their size, as shown by the pack figures, beginning with the largest, we have the corresponding percentages of five-year fish appearing in the following order: 69, 75, 59, 64, 43, 62, 60, 50. It will be noted that all but one of the first four percentages are larger than any of the last four.

The preceding table includes only the one-year-in-lake class, which in the Skeena basin always comprises the greater part of the run. But a variable number of fingerlings in this basin always linger for a second year's residence in the lake. What causes the wide variation in this respect is not known. During certain years practically all the brood of the previous year pass down to the sea on the approach of spring. In other years as high as 25 or 30 per cent. may tarry until their second spring. The percentages of this class occurring in the runs of the last six years are here shown: 1914, 7 per cent.; 1915, 15; 1916, 27; 1917, 14; 1918, less than 1 per cent.; 1919, 13.

The following table indicates the relative abundance of the age-groups belonging to the two classes. It will be noted that the four-year group that had spent one year in the lake increase in relative abundance toward the latter end of the season, while the five-year fish of the same class are most abundant at the opening of the run. The two-years-in-lake class agrees with the five-year fish above mentioned in becoming less abundant throughout the greater part of the season. But at the close of the run, during the month of August, a sudden increase appears and characterizes all the final days of the run. This was first observed in 1916 and in 1917 (Report for 1917, page 73), when on August 4th (1916) and on August 3rd (1917) remarkable increases in the fish of this class became apparent. In 1918 we have no August record, and the two-years-in-lake class becomes less and less numerous throughout the month of July. In 1919 our series is unusually complete, with five records in August. The change manifests itself suddenly on August 1st.

Table XXXVIII.—Percentages of Different Age-groups, Skeena River Sockeyes, found to constitute the Run on a Succession of Dates, Season of 1919.

Dates, 1919.	One Year in Lake.		Two Years in Lake.	
	Four Years old.	Five Years old.	Five Years old.	Six Years old.
June 23	12	75	8	5
„ 27	14	65	17	4
„ 30	20	68	10	2
July 4	15	71	9	5
„ 7	20	63	12	5
„ 11	22	71	5	2
„ 14	22	69	4	5
„ 18	22	72	4	2
„ 21	37	53	9	1
„ 25	39	55	4	2
„ 28	32	57	6	5
Aug. 1	23	58	16	3
„ 5	38	50	9	3
„ 8	40	46	7	7
„ 13	39	45	10	6
„ 15	36	41	15	8
Totals	27	60	9	4

The preceding table confirms a generalization we have previously stated concerning the effect of the extra year spent in the lake on the individuals comprising the two-years-in-lake group. The effect is not in the direction of increasing their size, for, as will be shown later, the five-year fish of this group are no larger than the four-year fish of the one-year-in-lake group; and, similarly, the six-year fish of one are no larger than the five-year fish of the other group. But the extra year of life in the Skeena race, as has been previously noted elsewhere, exercises a certain influence in accelerating development. Were this not the case we should find the same numerical relations between the five- and six-year fish of one group that we find between the four- and five-year fish of the other. If five-year fish of the one-year-in-lake type greatly exceeded in numbers the four-year fish of this group, as is constantly the case in the Skeena, we might expect the six-year fish of the two-years-in-lake type similarly to outnumber the five-year fish of the same class. But this is what we never find. The accelerating effect of age strongly modifies the results. The tendency of the Skeena race to spend four seasons feeding and growing at sea is met by an opposing tendency to mature at the age of five. The final outcome is well illustrated by the statistics of the 1919 run. The sea-feeding habit so far triumphs that no individual of the two-years-in-lake group mature at the age of four and the ages at which individuals of this group may mature is advanced an entire year. The sea-feeding habit thus predominates in its effect. But the age-maturing habit is not without an appreciable influence. For in 1919, whereas in the one-year-in-lake group 31 per cent. matured after three years sea-feeding and 69 per cent. after four years in the sea, the proportions were reversed in the two-years-in-lake group, in which 69 per cent. matured after three seasons in the sea, while only 31 per cent. had tarried at sea for an additional year.

The same tendency is manifest in those individuals which spend three years in fresh water. While the sea-feeding requirements prevent the maturity of these fish in either their fourth or their fifth years, the age requirement almost wholly prevents the continuation of life into their seventh year. Fish of this class mature almost exclusively in their sixth year. Only in streams which enter Bering Sea have we found many seven-year individuals of this class. But the retarding influences of the cold north on development are well known.

Table XXXIX.—Relative Numbers in One-year-in-lake and Two-years-in-lake Groups, Skeena River Sockeyes, 1919, on a Succession of Dates.

Dates, 1919.	One Year in Lake.	Two Years in Lake.
June 23, 27, 30	85	15
July 4, 7, 11	88	12
July 14, 18, 21	92	8
July 25, 28, Aug. 1	86	14
Aug. 5, 8, 13	86	14
Aug. 15	77	23

Table XL.—Percentages of Skeena River Sockeyes on Different Dates during the Season of 1919, having Equal Number of Years on the Sea-feeding Grounds.

Dates, 1919.	Three Years in Sea, Four and Five Years old.	Four Years in Sea, Five and Six Years old.
June 23, 27, 30	27	73
July 4, 7, 11	26	74
July 14, 18, 21	33	67
July 25, 28, Aug. 1	40	60
Aug. 5, 8, 13	48	52
Aug. 15	51	49

The above table divides the run according to the length of time spent at sea, where the major part of the growth occurs. Those individuals that had spent four years at sea showed a marked tendency to enter the river early in the season. Some of these are five years old, having spent but one year in fresh water; others are in their sixth year, having lived two years in the lake before migrating seawards.

(2.) RELATIVE NUMBERS OF MALES AND FEMALES.

During the season of 1919 samples were examined on sixteen different days, about evenly spaced throughout the run; 1967 sockeyes were included in these samples, 49 per cent. being males and 51 per cent. females. While the proportions of the sexes vary widely during different portions of the run, sometimes the males and at other times the females being largely in excess, the total numbers during the entire run are always approximately equal. There seems to be no constant total excess of males or of females, the apparent slight disparity of numbers being in some years in favour of the males and in others in favour of the females.

Table XLI.—Percentage of Males and Females, One-year-in-lake Group, Skeena River Sockeyes, 1919, on a Succession of Dates.

Dates, 1919.	FOUR YEARS OLD.		FIVE YEARS OLD.	
	Males.	Females.	Males.	Females.
June 23, 27, 30	58	42	46	54
July 4, 7, 11	65	35	49	51
July 14, 18, 21	59	41	46	54
July 25, 28, Aug. 1	55	45	46	54
Aug. 5, 8, 13	44	56	43	57
Aug. 15	40	60	47	53

Although the total number of males in any annual run approximately equals the total number of females, this is by no means true for each of the age-groups which together comprise the run. The four-year males of the dominant type (one-year-in-lake class) always exceed the four-year females of their group, but the disparity in numbers of four-year males and females in the Skeena basin is less pronounced than in Rivers Inlet. The average percentages in the Skeena for the past eight years are 61 per cent. four-year males and 39 per cent. four-year females. The Rivers

Inlet averages for the past seven years are 72 per cent. four-year males and 28 per cent. four-year females. This difference in the two basins may stand related to the fact that in Rivers Inlet a larger percentage of individuals mature at the age of five than is the case in the Skeena, the average for seven years in Rivers Inlet being 67 per cent.; for eight years in the Skeena, 60 per cent. Theoretically, we should expect to find that a race maturing largely at the age of five would retard the development of the precocious males from their third to their fourth year. In such a race we might anticipate an almost total absence of three-year male grilse and a correspondingly larger proportion of four-year males. We have been unable to examine the occurrence of grilse in Rivers Inlet and the Skeena, as fishing in these waters is carried on solely by gill-nets, through the coarse meshes of which the grilse would readily pass.

Table XLII.—Relative Numbers of Males and Females in Different Year-groups, Skeena River Sockeyes, in a Series of Years.

Years.	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1912	54	46	42	58	..	..	..	..
1913	69	31	47	53	..	..	..	..
1914	60	40	47	53	..	..	..	..
1915	55	45	45	55	..	..	..	..
1916	70	30	43	57	56	44	54	46
1917	65	35	48	52	65	35	58	42
1918	63	37	46	54	61	39	56	44
1919	53	47	46	54	52	48	45	55

(3.) Lengths and Weights.

The lengths of the Skeena River sockeyes in 1919 were so close to the averages for the previous seven years that the fish must be considered normal in that respect. The four-year males and females of the predominating one-year-in-lake type were slightly larger than the previous averages, and the five-year males and females of the same type were slightly smaller.

	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
Average lengths, 1912 to 1918	24.0	23.3	25.9	25.0
Average lengths, 1919	24.3	23.4	25.7	24.8

The differences are so small in amount they might be considered due to errors associated with our method of sampling, but it may be significant that the two classes vary in opposite directions, while the males and the females of each class vary together. Using the averages from 1912 to 1918, it is seen that the four-year males increase their length by 7.9 per cent. during the next year and the females increase their length by 7.3 per cent.

Comparing in the same way the average weights for five years, from 1914 to 1918, we find that during their fifth year males of the dominant Skeena type increase their weight by 22 per cent. and females by 20 per cent.

Table XLIII.—Average Lengths of Skeena River Sockeyes, One Year in Lake, for Eight Successive Years.

	1912.	1913.	1914.	1915.	1916.	1917.	1918.	1919.
Four-year males	24.6	23.5	24.2	24.2	23.9	23.6	24.1	24.3
Four-year females	23.5	22.9	23.4	23.5	23.6	23.2	23.3	23.4
Five-year males	26.4	25.5	26.2	25.9	26.2	25.5	25.9	25.7
Five-year females	25.2	24.7	25.1	25.0	25.0	24.7	25.0	24.8

Table XLIV.—Skeena River Sockeyes, Run of 1919, One Year in Lake, grouped by Length, Age, and Sex.

Length in Inches.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
21	1	..	1	..
21½	1	2	..	..
22	1	17	1	..
22½	13	32	..	4
23	29	53	5	19
23½	35	55	8	37
24	55	47	27	105
24½	53	25	43	123
25	46	13	93	152
25½	28	1	109	112
26	13	1	114	59
26½	4	..	79	17
27	1	..	41	5
27½	..	..	21	2
28	..	..	1	..
28½	..	..	1	..
29	..	..	1	..
Totals	280	246	545	635
Average length	24.3	23.4	25.7	24.8

The following table gives average lengths of sockeyes which remained two years in the lake before migrating seawards. Like the one-year-in-lake group, these spend three and four seasons in the sea before maturing and seek the spawning-grounds when in their fifth and sixth years instead of in their fourth and fifth years, as in the previous group. But the extra year spent in the lake has not increased their final stature. The 1919 average lengths compare as follows:—

One-year-in-lake four-year males, 24.3; four-year females, 23.4.
Two-years-in-lake five-year males, 24.3; five-year females, 23.4.
One-year-in-lake five-year males, 25.7; five-year females, 24.8.
Two-years-in-lake six-year males, 25.8; six-year females, 24.7.

Table XLV.—Average Lengths of Skeena River Sockeyes, Two Years in Lake, for Four Successive Years.

	1916.	1917.	1918.	1919.
Five-year males	24.1	23.9	23.9	24.3
Five-year females	23.8	23.8	23.4	23.4
Six-year males	26.2	25.4	25.2	25.8
Six-year females	24.8	25.0	24.7	24.7

Table XLVI.—Skeena River Sockeyes; Run of 1919, One Year in Lake, grouped by Weight, Age, and Sex.

Weight in Pounds.	Number of Individuals examined.			
	Four Years old.		Five Years old.	
	Males.	Females.	Males.	Females.
3½	1	..	..	..
4	2	3	1	1
4½	7	26	1	3
5	33	67	7	40
5½	51	66	27	97
6	78	53	81	199
6½	61	22	115	153
7	25	6	125	94
7½	19	3	85	39
8	2	..	66	7
8½	1	..	26	2
9	..	..	7	..
9½	..	..	3	..
10	..	..	1	..
Totals	280	246	545	635
Average weight	6.1	5.5	7.0	6.2

Table XLVII.—Average Weights, Skeena River Sockeyes, for Six Successive Years.

	1914.	1915.	1916.	1917.	1918.	1919.
One year in lake—						
Four-year males	5.9	5.7	5.4	5.3	5.8	6.1
Four-year females	5.3	5.2	5.1	5.0	5.3	5.5
Five-year males	7.2	6.8	7.1	6.4	6.9	7.0
Five-year females	6.3	6.2	6.3	6.0	6.4	6.2
Two years in lake—						
Five-year males	..	5.9	5.8	5.5	5.7	6.1
Five-year females	..	5.2	5.4	5.2	5.3	5.4
Six-year males	..	6.6	7.1	6.3	6.6	6.9
Six-year females	..	6.0	5.9	5.8	6.1	6.3

IV. THE NASS RIVER SOCKEYE RUN IN 1919.

(1.) General Considerations.

In our discussion of the Nass River run of 1916, we said (Report for 1917, page 76): "While there is reason to fear that the other principal streams in the Province are beginning to experience the effects of overfishing, the lower levels of the fluctuations in the runs becoming lower and the higher levels less high, there seems to be no indication so far that the Nass River has suffered." That statement is still valid after the season of 1919, though with less certainty concerning favourable conditions on the Nass. Dividing the period in the history of the river since 1903 into groups of four years each, we find the total pack of sockeyes from 1903 to 1906 to be 70,066 cases; from 1907 to 1910, 104,453 cases; from 1911 to 1914, 128,265 cases; and from 1915 to 1918, 114,764 cases. During the war period, from 1915 to 1918, when every effort was being made to increase food production to the utmost, the output of the Nass in sockeye salmon was distinctly less than for the preceding four-year period. For two years within the war period, 1917 and 1918, the sockeye-packs were less than they had been since 1917, while the average for the four years is less than that for the last decade. This unfavourable history gives cause for uneasiness, but does not yet furnish demonstration that injury has been done to the Nass River run. It does, however, counsel extreme caution in the handling of this industry.

The 1919 pack of 28,259 cases of sockeyes, while a gratifying improvement over the two very poor years which preceded, is again not equal to the average for the last decade. Extreme interest will attach to the history of the next three or four years on this river.

(2.) The Age-groups.

The wide diversity in type in Nass River sockeyes is a continuing feature and is a definite constant characteristic of the race which inhabits this watershed. Every run since 1912 has been analysed by us and the results put on record. In no season have we failed to find four main groups represented: (1) The sea-type (three and four years old); (2) the one-year-in-lake type (four, five, and six years old); (3) the two-years-in-lake type (five and six years old); (4) the three-years-in-lake type (six and seven years old). We have then one three-year age-group; two of four years; two of five years; three of six years; and one of seven years. Thus nine different age-groups occur in this river-basin. Several of them are subsidiary and comparatively of little commercial importance. From the following table, giving the distribution of all the individuals examined in 1919, the relative importance of the different groups is seen at a glance. These individuals, it is believed, give us a fair cross-section of the entire run. They were taken at random, without selection, from piles of salmon on the cannery floor, and samples of this kind were taken on the average every other day throughout the fishing season from June 30th to August 18th. The total number of Nass River sockeyes for the season of 1919 thus examined and assigned to their appropriate groups is 1,724.

Table XLVIII.—Nass River Sockeyes which ran in 1919, grouped by Age, Sex, and Size, and by their Early History.

Length in Inches.	Number of Individuals.													
	One-year-in-lake Type.				Two-years-in-lake Type.				Three-years-in-lake Type.				No Year in Lake (Sea-type).	
	Four Years old.		Five Years old.		Five Years old.		Six Years old.		Six Years old.		Seven Years old.		Four Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
22	1	1	..	..	..	..	..	..	..	..	..	..	..	..
22½	..	1	..	..	..	..	..	..	..	..	..	..	..	..
23	4	7	..	2	1	4	..	..	..	..	..	..	..	1
23½	3	10	2	5	1	5	..	..	..	..	..	..	..	1
24	6	12	6	30	4	15	..	2	..	..	..	..	..	..
24½	10	9	6	22	9	36	..	2	..	..	..	..	..	3
25	13	7	23	47	25	104	3	5	..	..	..	..	1	2
25½	10	4	22	29	54	103	1	3	..	..	..	..	3	1
26	8	2	37	28	95	144	5	4	..	..	1	..	4	2
26½	2	..	32	13	96	105	3	5	..	1	2	..	1	1
27	1	..	23	9	120	69	2	11	1	..	..	..	1	1
27½	2	..	13	4	54	10	5	6	..	..	..	1	..	..
28	..	..	9	1	42	..	14	5	1	..	3	1	1	..
28½	..	..	2	..	5	2	4	..	..	..	..	1	..	..
29	..	..	1	..	..	..	14	5	..	..	..	..	..	..
29½	..	..	..	..	1	..	..	..	1	..	..	..	..	..
30	..	..	1	..	..	..	5	..	..	..	..	..	..	..
Total No.	60	53	177	190	507	597	56	48	3	1	6	3	11	12
Ave. length	24.9	24.1	26.2	25.2	26.5	25.8	27.9	26.7	28.2	26.5	27.2	28.0	26.1	25.1
Ave. weight	6.0	5.5	6.6	5.9	6.7	6.1	7.8	6.7	7.7	7.0	7.1	7.5	6.4	5.7

It will be noted in the table that the great majority of the Nass sockeyes, in 1919 as in all former years, fall within the first and second types—they spent either one year or they spent two years in their native lake before undertaking the downward migration to the sea. Four different groups are included under these two types. Taken together, they always constitute the bulk of the run, but among themselves they exhibit through the years considerable variation in their relative importance. Always the two five-year groups greatly exceed in numbers the other two, and usually the five-year group which belongs to the two-years-in-lake type is more numerously represented than the five-year group of the one-year-in-lake type.

Considering only the four groups above mentioned and disregarding for the moment the other groups of inconsiderable commercial value, we find the run of 1919 consisted of the following: Four-year fish (one-year-in-lake type), 7 per cent.; five-year fish (one-year-in-lake type), 22 per cent.; five-year fish (two-years-in-lake type), 65 per cent.; six-year fish (two-years-in-lake type), 6 per cent.

The following table contains similar data for each of the eight years during which the sockeye run of the Nass has been under investigation. The percentages for 1919 diverged remarkably little from the average percentages for the eight years.

Table XLIX.

Year.	Percentage of Individuals that spent			
	One Year in Lake.		Two Years in Lake.	
	Four Years old.	Five Years old.	Five Years old.	Six Years old.
1912	8	27	63	2
1913	15	12	71	2
1914	4	41	45	10
1915	19	14	59	8
1916	9	17	66	8
1917	10	15	71	4
1918	30	16	45	9
1919	7	22	65	6
Averages	13	21	60	6

In Table L., which follows, we present the percentages of the different year-groups that were present in 1919 during each of the dates on which the run was sampled. The percentages for any given day are of necessity based on very limited material, and many of the minor variations in these percentages from day to day are to be ascribed to this fact. The table indicates, however, beyond question, during what part of the run any given group had its maximum representation, when it began, and when it ended.

It appears from the table not only that the run is very complex, but that it is a well-ordered complexity. The different groups appear and develop in orderly sequence, and are marshalled as distinctly in assemblages with determinate numerical ratios as though they had schooled separately at sea and were returning each under migration laws peculiar to itself. Furthermore, the system pursued by the age-groups in 1919 is identical with that of former years. A comparison with similar tables which we have presented in previous years makes this evident, and testifies to the delicacy of the adjustments which govern so rigidly the migration behaviour of the different age-groups. Adjustments of this nature in other animals escape our observation, for we have ordinarily no means of grouping individuals in accordance with the important facts in their life-history. The categories themselves are unrecognized and unsuspected, and no possibility is presented of delving far beneath the surface. Formerly this condition obtained with the salmon also, for nothing in the external appearance, the size, or the structure makes it possible to distinguish one group from another. As they pass before our unaided eyes during the fishing season the impression is given of a homogeneous assemblage. Not until we have learned to decipher their autobiographies, as inscribed on their own scales, do we become aware of the play of forces and the responses and aware of the diverse elements, each governed by its own laws and each articulating perfectly with the main body of the run.

Table L.—Percentages in each Class of Nass River Sockeyes running at Different Dates in 1919.

	One Year in Lake.		Two Years in Lake.		Three Yrs. in Lake.		Sea-type.	Number of Individuals examined.
	Four Years old.	Five Years old.	Five Years old.	Six Years old.	Six Years old.	Seven Years old.	Four Years old.	
June 30	2	30	52	2	..	..	14	50
July 1	..	37	56	2	..	..	5	48
„ 2	2	42	50	..	..	..	6	50
„ 4	..	41	56	..	..	..	3	39
„ 5	..	48	45	..	..	..	7	46
„ 7	..	44	56	..	..	..	..	45
„ 8	4	36	58	..	..	..	2	50
„ 10	2	44	50	2	..	..	2	50
„ 11	2	58	40	..	..	..	..	50
„ 12	..	56	44	..	..	..	..	50
„ 14	4	48	48	..	..	..	..	50
„ 15	6	63	28	3	..	..	..	35
„ 17	14	51	29	6	..	..	..	99
„ 19	13	37	45	5	..	..	..	60
„ 21	18	17	61	4	..	..	..	130
„ 26	8	10	75	6	..	1	..	120
„ 28	4	5	87	3	..	..	1	130
Aug. 1	3	6	82	9	..	..	..	123
„ 5	6	6	83	5	..	..	..	124
„ 8	..	1	83	13	..	3	..	70
„ 9	..	9	85	6	..	..	..	35
„ 11	3	2	77	16	..	2	..	95
„ 13	1	7	67	19	2	4	..	88
„ 15	4	..	74	20	2	..	..	50
„ 18	..	..	77	18	5	..	..	22
„ 21	..	..	83	17	..	..	..	12

Table LI.—Nass River Sockeyes, Average Lengths of Different Classes from 1912 to 1919.

	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1912 (inches)	24.6	23.3	26.5	25.1	26.2	25.4	27.0	25.6
1913 „	24.1	23.5	25.6	24.8	26.0	25.2	26.0	26.6
1914 „	24.6	22.7	26.1	25.1	26.3	25.5	26.9	25.6
1915 „	24.0	23.5	25.9	25.2	26.5	25.9	26.6	25.3
1916 „	24.5	23.3	26.4	25.0	26.5	25.6	27.9	25.7
1917 „	23.4	23.2	25.5	24.7	25.3	24.7	26.5	25.5
1918 „	25.0	24.3	25.7	24.7	25.9	25.0	27.2	25.2
1919 „	24.9	24.1	26.2	25.2	26.5	25.8	27.9	26.7

Table LII.—Nass River Sockeyes, Average Weights of Different Classes from 1912 to 1919.

	One Year in Lake.				Two Years in Lake.			
	Four Years old.		Five Years old.		Five Years old.		Six Years old.	
	Males.	Females.	Males.	Females.	Males.	Females.	Males.	Females.
1913 (pounds)	5.5		6.3		6.5		6.7	
1914 „	6.2	5.0	7.4	6.5	7.2	6.5	7.9	6.8
1915 „	5.6	5.2	6.9	6.4	7.0	6.6	7.2	6.5
1916 „	6.0	5.3	7.2	6.3	7.2	6.2	8.1	6.4
1917 „	5.3	5.3	6.8	6.2	6.3	5.8	7.3	6.4
1918 „	6.3	5.8	7.2	6.3	7.2	6.4	8.3	6.7
1919 „	6.0	5.5	6.6	5.9	6.7	6.1	7.8	6.7

Two-years-in-lake type of Nass River sockeye in sixth year.

Centre of scale shown in preceding figure.

Three-years-in-lake type of Nass River sockeye in sixth year.

Centre of scale of three-years-in-lake type of Nass River sockeye.

Sea-type of Fraser River sockeye in fourth year.

Fraser River sockeye in fifth year.

MEMORANDUM RESPECTING SALMON-FISHERY REGULATIONS FOR THE PROVINCE OF BRITISH COLUMBIA.

By Hon. William Sloan, Fisheries Commissioner for Province.

The question of conserving the supply of salmon in our waters has long been one of keen interest. The 1905-07 Dominion Fisheries Commission, after a long investigation, recommended that "effective measures for securing some limitation of the exploitation of the northern waters of British Columbia be adopted." Acting on that report the Minister at Ottawa in 1908 set forth that no additional canneries would be licensed and that the number of boats in each section would be limited. The Dominion-Provincial Boat Rating Commission of 1910 reported against any increase in canneries or boats, and no increase was made until 1912, when an additional cannery licence was granted on the understanding that only white labour would be employed in operating the plant and in catching the fish; an understanding that was never carried out. Further cannery licences were granted in 1913, 1916, 1917, and 1918. There are now some ten more salmon-canneries in the North than there were in 1908, and many more gill and purse nets, and the deadly drag-seines are being operated, and traps have been installed in some localities. In 1917 the Dominion Commission, following hearings held throughout the North, reported that in their judgment "neither the ambitions of an individual nor the business strategy of a company is in itself sufficient ground for a change of public policy, and we do not regard the general result of the Department's change in policy which began in 1912 as having improved the situation from the public point of view, and we believe that the removal of all restrictions, under the present conditions as to the supply of salmon, would only open the way towards inefficiency and loss."

It should be the first policy of the Government to prevent depletion, to ensure continuance, and at the same time to eliminate useless competition and excessive overhead charges. The policy suggested by me is a move in that direction. If adopted it will conserve the supply and increase the earnings of the individual fishermen. There is abundant evidence that the salmon of the North and of Vancouver Island are rapidly being depleted. Unless they are given far more protection than is now afforded them they will go the way of the salmon of the Fraser. There is no doubt of that. The Fraser was once the greatest salmon-river of the world. The vast schools of salmon that used to seek its waters annually have been fished out. (*See* statement made to the American-Canadian Fisheries Commission, pages 53 and 54, British Columbia Fisheries Report, 1918; copy attached—Exhibit 1.) As a salmon-stream it is now in the third or fourth place in the salmon-streams of this Province. There has been no limitation placed on the fisheries of the Fraser, except a modest weekly closed period. They have been open to all that wished to engage. There are thirty-two canneries on the Fraser, but twelve of which have opened their doors this year, and combined they packed but 34,000 cases of sockeye salmon, and in almost every case they operated at a loss.

At the present time the canning plants on the Skeena and Nass Rivers and Rivers Inlet could have this year put up the entire pack in less than twelve days of eight hours each, whereas they were operated for over sixty-five days. Fixed charges were needlessly heavy because of the numerous plants, and have resulted in such high prices as to seriously affect the public interest. A further increase in the number of plants and the amount of gear employed on those waters will not better conditions.

I believe that the withdrawing of restrictions in the fishing regulations, as proposed, will most certainly have a disastrous effect upon the runs unless at the time of amendment most drastic additions are made to the present weekly and annual closed seasons. If the fishing is to be thrown open to all-comers, it will result in placing on the fishing-grounds of the North and Vancouver Island the now unused Fraser River fleet of fishing-boats. Depletion will surely result unless the present weekly close season of forty hours is extended to at least seventy-two hours, and to a further and material restriction of the present commercial fishing areas. To provide such an extension of closed hours will make it extremely difficult for fishermen to earn a weekly living wage without such a material increase in the price paid for fish as will add greatly to the cost of the product.

I suggest that the time has come for a complete and radical change in the policy of handling our fisheries. It is time that the Government stepped in to seriously protect the fish, eliminate

all useless competition, overequipment, and waste, to the end that the people may be able to obtain at a fair price one of the natural food products of this Province. To permit a further depletion of the salmon-fisheries of the Province would be a "policy which could only be characterized as a criminal policy." The fish of this Province, notwithstanding the depletion of both the salmon and the halibut, are still one of its greatest food assets. They are one of the greatest assets the Province possesses. With judicious handling the fisheries can be maintained for all time. The depleted fisheries can be built up, but they cannot be maintained if the present methods are to continue. The Fraser River fishery demonstrates what will happen if things are to go on as they have been going.

We have overdone the thing. We have drawn, and are drawing, too heavily upon our supply of salmon and of halibut. (*See* attached excerpt from House of Commons Debates, January 19th, 1907, page 1722—Exhibit 2.) What we need is a complete and radical change of policy; a departure altogether different from past and existing methods. The time has come when the Government should step in and take over our salmon-fisheries and administer them for the benefit of the people as a whole and for all time. They should step in and take over the salmon-fisheries just as the British and United States Governments have taken over the fur-seal fisheries of the North Pacific. Instead of licensing existing and new companies and individuals to take and handle our salmon-fisheries the Government should take them over and handle them. By so doing the fish would be given full protection. There will be a radical reduction in equipment and a consequent reduction in overhead expenses that will materially reduce the retail price of both fresh and canned salmon. And at the same time the Government, being serious in its desire to help returned men, can do so by taking control of the salmon-fisheries and install returned men to operate them.

The Governments of Great Britain and the United States took over the fur-seal industry because it was essential to the preservation of the fur-seal. (*See* excerpt from Hansard, February 27th, 1908, page 3954, attached—Exhibit 3.) The fur-seal was threatened with extinction. Corporate and individual enterprise was killing them off. The Governments took them out of the hands of corporations and individuals and adopted a policy that has materially increased the numbers in the herds of fur-seals.

There is no inherent difficulty in taking over the salmon-fisheries. The existing operating companies in the salmon-fisheries have no operating rights beyond those granted them from year to year. The Government is under no obligations to renew the licences formerly granted to them. I suggest that the Government should assume the sole control of the entire salmon industry, even though that may mean compensation where it can be shown that compensation is due. Many of the salmon plants on the Fraser are at present a liability and not an asset of the owning companies. The plants of Northern British Columbia will in a short period be as valueless as the plants on the Fraser if the existing policy of depletion is continued. The history of the Fraser will be repeated. The salmon-fisheries of British Columbia will be depleted as Alaska is being depleted. (*See* attached statement of Charles D. Garfield, Alaska Fish Commissioner, Fishing Gazette, New York, December, 1919, page 28—Exhibit 4.) The Government should bear this in mind in taking over existing plants that may be found necessary for the work under Government control. The Government can, by combining its efforts, reduce overhead expenses by several hundred per cent. It can in consequence sell cheaper. It can put up as good, if not a better and more uniform pack. Being a Government-guaranteed product, it will be in greater foreign demand. And what is of greater importance, it will ensure the continuance of the salmon runs.

Government owned and operated fisheries, and I do not confine the suggestion that Government ownership be confined to the salmon-fisheries alone, for I would include trawl-caught fish, which together with the salmon would prove a valuable adjunct to the two transcontinental railway-lines owned and operated by the Government. (*See* report of Select Committee appointed to deal with schemes and suggestions made with a view of rehabilitating soldiers, Journals of British Columbia Legislature, pages 172-4, 1919; copy attached—Exhibit 5.) By the addition of large freezing and cold-storage plants at or near Prince Rupert and Vancouver, the Pacific terminal ports of Government-owned railway-lines, the Government will be in a position to supply the North-west Provinces and Eastern Canada with fish at cheap prices, employ returned men, and to dominate the local fish-food markets, to the immediate and lasting benefit of the fish and the people.

The fish of the Province belong to the people of Canada. They constitute one of their greatest natural assets. When our minerals and our timbers are drawn upon they are lessened to that extent. Minerals cannot be replaced. Our forests may, at great expense, be restored by reforestation, but they then will not be available for several generations. Our fisheries, on the other hand, will last for all time if they are properly handled. Depleted runs can be restored. The runs of former years may even be enlarged. All that is necessary to maintain our salmon-supply is to ensure that a sufficient number of fish reach the spawning-grounds. If the beds are well seeded there will be a certain return. The fish will do all the work necessary, provided the Government gives them a chance to do so. They will perpetuate themselves without cost. They will entirely disappear if left to corporate and individual control.

The policy here advocated will meet with the approval of the people of Canada, since it means that the fisheries will be maintained in their interest, and that they may have fish at a cheaper price.

The policy proposed is a practical and sane business thing for the Government to undertake. It is a business that will pay dividends in a greater supply of fish, and at a cheaper price, not only to the people of to-day, but to our people that are to come after. Government control and operation is, in my opinion, the solution of this great economic question.

The Privy Council decided that the right to administer the fisheries of this Province rested with the Dominion, and that the right to fish was a public right subject to regulation by the Dominion. Provided the Dominion Government is not prepared to accept the policy here advocated, and operating our fisheries, I maintain that the Dominion should surrender that right to British Columbia.

We are facing rapidly changing conditions, and the time is opportune to assure the conservation of the Pacific Coast fisheries for the present and the future benefit of the whole people of Canada rather than sacrifice this great Provincial and national asset to satisfy the shortsighted greed of a small minority.

Victoria, B.C., December 29th, 1919,

(EXHIBIT 1.)

STATEMENT SUBMITTED TO THE AMERICAN-CANADIAN FISHERIES COMMISSION BY THE HON. WILLIAM SLOAN, COMMISSIONER OF FISHERIES, AT THE VANCOUVER MEETING, 1918.

GENTLEMEN OF THE COMMISSION,—As the Commissioner of Fisheries for the Province of British Columbia, I desire to comment briefly on the present precarious condition of the sockeye-salmon fishery of the Fraser River. The watershed of that river and its channels lie wholly within the Province. From its watershed have came all but a fraction of the sockeye that have been taken in the waters contiguous to the International Boundary-line which separates the Province of British Columbia and the State of Washington. From that watershed must continue to come the seaward migrants of sockeye which produce the commercial runs of sockeye to those waters, because there is no other watershed tributary to those waters which affords sufficient spawning and rearing waters for sockeye salmon. The vast runs of former big years demonstrate the extent and the value of the runs that that watershed can produce. It is the greatest sockeye-producing watershed known. No other watershed has produced such vast numbers of sockeye. That watershed is to-day as capable as ever of producing the vast run of the past. It has not been contaminated. Settlement, power, and irrigation have not injured it in any way. It needs only to be protected to produce the great runs of the past. Its produce has been lessened—almost destroyed—because a sufficient number of spawning sockeye has not been permitted to reach it. The runs in the three last years have steadily decreased because too few of the adult salmon have escaped capture in Dominion and State waters; because of excessive fishing too many have been captured. The run of the big year was further destroyed by a rock-slide blocking the river-channel at Hell's Gate in 1913.

That the runs in the three last years have been almost wiped out by commercial fishing and that the run in the big year has been alarmingly decreased has been ably demonstrated by statements already submitted to you. It is unnecessary here to more than call your attention to the evidence of depletion already in your hands. I do, however, accentuate the fact that the

evidence submitted to you by our Department is founded upon scientifically ascertained facts. The watershed of the Fraser and the fishing areas supplied by it have been under close scrutiny since 1901. No other has been so carefully observed. The history of the race of sockeye that frequent the Fraser is better known than that of any other district. The facts are no longer questioned. *The run of sockeye to the Fraser is perilously near to extermination. They will be exterminated if conditions remain as they are, and in so short a period as to wipe out all interests of both fishermen and canners.* In view of the evidence there is, in my judgment, but one thing to do. Adopt measures that will ensure to the watershed all the sockeye that still survive. To that end I would suggest that the toal prohibition of sockeye-fishing in the waters frequented by those produced in the Fraser River until such time as they have recovered from their depleted condition. I suggest this though it does involve compensation to resident fishermen and canners who can establish that they are entitled to compensation by their respective Governments. It is fruitless to rely upon concurrent regulations in British Columbia and the State of Washington waters. That has been tried and failed. Such efforts will continue to fail. Present commercial and monetary considerations must be eliminated. It must be in an international way, because it is an international question. It is one of the greatest fishery questions in which Canada and the United States are now concerned. The only adequate, the only permanent solution of this question, I submit, is the acquisition by Canada and the United States of all the rights in this fishery of which they may not now be in possession. That being established, the waters should be closed to sockeye-fishing for such a period of time as is necessary to restore the runs to the abundance of former big years. When that has been accomplished, let fishing be resumed under supervision and for the benefit of the two nations until such time as they have been recouped for their expenditures, and thereafter in such manner and to the end that the supply may not again become depleted.

I submit, gentlemen, that the Governments of Canada and the United States should recognize that the conditions confronting them demand such treatment. There is no gainsaying the evidence. The watershed of the Fraser River will, when adequately protected, produce more sockeye salmon than any known watershed. It produced in 1913 2,300,000 cases. In the three following lean years it produced an average of but 267,000 cases per year. Being in possession of a watershed capable of producing 2,300,000 cases a year, can any Government be content with conditions by which but 267,000 cases are produced, and the continuance of which will entirely destroy any production whatever? The evidence in the case is conclusive—it is undisputed; the fishery is in a precarious condition. There is, however, a difference of opinion as to the remedies to be applied. I submit that those best qualified to speak have made it plain that no temporary measures will produce desired results. The races of sockeye that frequent the Fraser cannot be restored by any half-way measure. To allow the destruction of the sockeye-fisheries of the Fraser River would be an unnatural, immoral, and unpatriotic policy.

The questions here involved are similar to those in the fur-seal case. They are international in character, and not Provincial or State questions, and must be dealt with upon broad national lines and in the interests of the people of Canada and the United States.

Faithfully yours,

WM. SLOAN,

Commissioner of Fisheries for British Columbia.

[NOTE.—Since the above representations were made we have had two seasons' fishing on the Fraser River and results have shown the decline in pack to be even more serious than predicted. The run of 1918 produced but 70,000 cases and that of 1919 will not be greater.]

(EXHIBIT 2.)

HOUSE OF COMMONS DEBATES. MR. SLOAN, COMOX-ATLIN.

(Hansard, January 18th, 1907, page 1722.)

"Dixon Entrance, more especially that portion to the south of the line and approaching Graham Island, is the most valuable halibut-fishery ground which we have, is being daily invaded by American fishermen, and unless prompt measures are taken to effectively patrol these waters the constant inroads will seriously deplete this very valuable territory. *The halibut-fishing in Dixon Entrance is carried on without regard to the spawning season or the observance of conditions necessary to a continuous supply, and it is being urged that regulations be enacted and*

enforced with a view to prolonging and maintaining unimpaired the present commercial value of these very important fisheries."

[NOTE.—No special consideration was given to this warning at that time, with the result that Dixon Entrance is now valueless, being completely denuded of halibut. The halibut-catch of 1918 was 14,000,000 lb. less than that of 1917, and not a pound of the 1918 catch was caught in Dixon Entrance.]

(EXHIBIT 3.)

HOUSE OF COMMONS DEBATES. MR. SLOAN, COMOX-ATLIN.

(Hansard, February 27th, 1908, page 3957.)

"I have shown the value to the world of the fur-seal fisheries of the North Pacific Ocean.

"I have pointed out the urgency of action being taken to save this valuable animal from total extinction.

"I have suggested the Hague Tribunal as competent and unbiased to deal with this question.

"In conclusion, Mr. Speaker, the destruction of the fur-seal species would be unwarranted; furthermore, it would be *an unnatural, immoral, and unpatriotic policy.*

"*The protection and conservation of the fur-seals of the North Pacific Ocean is an obligation due posterity by the nations of to-day, who are directly responsible and directly interested.*

"This question is not one that can be settled on lines of selfish consideration. It can only be settled by compromise and generous broad patriotic statesmanship."

[NOTE.—This long-outstanding and contentious question was finally adjusted without reference to the Hague Tribunal, and mainly along lines indicated at that time, and with most satisfactory results to the preservation of the fur-seals.]

(EXHIBIT 4.)

EXCERPTS FROM THE FISHING GAZETTE, NEW YORK, DECEMBER, 1919, PAGE 28.

"Charles D. Garfield, Alaska Fish Commissioner, recently told cannerymen that the fishing industry in the territory would be *completely demoralized within a very few years unless drastic restrictions are immediately placed in effect to allow sufficient fish to escape to the spawning-streams.* Mr. Garfield's address was given at a hearing conducted in the assembly-room of the Seattle Chamber of Commerce by the Department of Commerce on proposed legislative measures designed to exclude fishing in all of the streams and lakes of Alaska and in waters tributary to their mouths.

"For the last fifteen years the Government has been endeavouring to replenish the supply by building hatcheries and distributing salmon-fry. So far not a single instance has been recorded where these fish return to propagate in the waters in which they were released, and the fact seems well established that the efforts of the Government have proved a failure.

"It took 100,000,000 salmon to complete the packs of Alaska's 135 canneries during the years 1917 and 1918. *Within a few years these institutions will for the most part be scrapped and the industry ruined unless strict protective measures are adopted.*"

(EXHIBIT 5.)

Nos. 32 & 33.

VOTES AND PROCEEDINGS OF THE LEGISLATIVE ASSEMBLY OF BRITISH COLUMBIA.

FRIDAY, 14TH MARCH, 1919.

Mr. McGeer presented an interim report from the Select Committee appointed under Resolutions of the 20th and 24th days of February, 1919, to deal with schemes and suggestions made with a view to rehabilitating soldiers, as follows:—

MR. SPEAKER:

Your Select Committee was attended by Deputy Commissioner of Fisheries Babcock; and upon hearing Mr. Babcock and upon making further investigation, your Select Committee is of the opinion that in formulating measures for the rehabilitating of soldiers full consideration should be given to the fisheries, for two main reasons, the first being that your Committee

believes that the fishing industry, if properly developed, would provide employment for a large number of returned men, and the second was that by the proper development of that industry the high cost of living problem would be solved in a measure in at least one of its many phases. While your Committee made some investigation into the possibilities of the returned soldier engaging in what is known as the "salmon-fishing industry" in such places as the Fraser River and elsewhere, your Committee is not of the opinion, in view of the condition of that industry, that it presents the best possibilities for the successful employment of returned men, the reason for such conclusion being that it is the opinion of your Committee that a policy of conservation is at once necessary to re-establish that industry so that it may be made one of profitable possibilities for those engaging in it. For instance, your Committee ascertained the fact that in 1918 the total catch of sockeye salmon in the Fraser River was 75,000 cases, as compared with 553,000 cases which were captured in 1914, the brood-year of the 1918 run. *It is the opinion of your Committee that similar depletions are being made on the Nass River, Rivers Inlet, and most of the minor sockeye waters.*

Your Committee also ascertained that in connection with the halibut-fishing carried on on this Coast the 1918 catch shows a decrease of 14,000,000 lb. Your Committee, in view of the provisions of the "British North America Act" and subsequent legal interpretation of that Act, making it obligatory that the Dominion Government assume the full protection and encouragement of the fisheries of this Province, and in view of the fact that a direct revenue during the past ten years has been collected by the Dominion Government of between $45,000 and $50,000 a year, and under the new provisions as provided in the regulations recently issued by the Dominion Government that revenue is to be increased to $250,000 a year, deems it advisable that the Government of the Province of British Columbia should recommend to the Dominion Government in definite terms the necessity of developing the fishing industry in the Province of British Columbia along lines which will *mean the engaging of large numbers of returned men, and at the same time amply protect that industry from depletion and ultimate destruction.*

With reference to deep-sea fishing, your Committee ascertained that deep-sea trawling had been conducted out of the ports of British Columbia in 1917 and 1918 on a profitable basis, and that the operations afforded evidence of an ample wealth of food-fish to provide the possibilities of the development of an industry as yet practically unexploited. The extent of possible profitable employment in such an industry is evidenced by the facts shown by the operation of a trawler known as the "James Carruthers." This trawler was operated out of Prince Rupert in 1918, and made a total of forty-nine trips, making in all 151 days. The approximate catch was 2,000,000 lb., consisting of flounders, sole, witch, brill, and other fish. The amount which each fisherman received for the season's work was approximately $2,000 during the operation of the boat. It is understood that the boat was inactive for a period of six weeks owing to the fact that *no cold-storage facilities were available to handle the catch.*

Your Committee also found that a considerable amount of training is necessary before a man should engage in this particular occupation, and that more vessels of a suitable type would be necessary.

In the light of the above facts, your Committee humbly recommends that the Government of the Province of British Columbia urge upon the Dominion Government the establishment on the Pacific Coast of a trawling-school for the training of men to engage in deep-sea trawl-fishing by providing a number of suitable vessels equipped for deep-sea fishing officered by experienced navigators, engineers, and fishermen, who would act in the capacity of instructors, and to whom returned soldiers could be apprenticed for instruction in navigation, the operation of steam and gas engines, care, casting, and hauling of trawling-nets, and the dressing, storing, curing, packing, and shipment of fish; the men during their apprenticeship to be paid a proper living wage and to be given a bonus from the ship's earnings after capital expenditure had been provided for. It is believed by your Committee that, well managed, such an operation would be sufficiently profitable to furnish the means of operation and maintenance, and create a sinking fund that would reimburse the Government and permit the vessel to be transferred to organizations of the men who would be desirous of operating on their own behalf in the course of time. It is the opinion of your Committee that at the present time there is room for ten such training-ships on the Pacific Coast of Canada, each of which could provide training for at lease twenty-five apprentices. Such a school, it is believed by your Committee, could be directed and operated in connection with the Naval Training School now established at

Esquimalt. In further connection with the deep-sea fishing industry, it is the opinion of your Committee that the Dominion Government should establish at suitable places in the Province, such as Prince Rupert, Vancouver, and Victoria, fish curing, packing, and marketing schools for the practical training of overseas men in the curing, packing, and marketing of fish, and through which the catches of the trawlers could be distributed. Your Committee is of the opinion that such a proposal, if established, would mean the development of an industry through which it would be possible to distribute fish not only in the Province of British Columbia, but throughout the North-west, as far as and including the Province of Manitoba.

Your Committee further recommends that, in the event of the Dominion Government not seeing its way clear to inaugurate and maintain such a training-school or to lay down some broad lines for the *development along lines of conservation*, the Dominion Government be *requested to turn over the entire fisheries of the Province of British Columbia to the Government of the Province of British Columbia*, by way of leasing such fishing grounds or areas to the Province; and in the event of such being done by the Dominion your Committee humbly recommends that the Government of this Province take into its consideration the advisability of laying down a policy embracing the putting into effect and the carrying-out of the recommendations hereinbefore made.

G. G. MCGEER.

The report was received.

Ordered, That the report be considered on Tuesday next.

[NOTE.—This important resolution received unanimous support of the British Columbia Legislature. It points out urgent necessity for conservation, deals with inadequate cold-storage facilities, lays down proposals to assist returned soldiers by engaging in trawling industry. So far as known, no consideration has yet been given this resolution.]

THE FRASER RIVER SALMON SITUATION: A RECLAMATION PROJECT.

By JOHN PEASE BABCOCK.

The sockeye-salmon fishery of the Fraser River system was formerly the world's greatest salmon-fishery. The run of salmon in those waters was greater every fourth year than in any other waters. This fishery is no longer a great fishery. A discriminating study of the significant facts in the development and decline of this fishery demonstrates the necessity of dealing with them at once in an international way. These facts have been fully established, are no longer questioned, and should be more generally understood.

The restoration of the sockeye-salmon fishery of the Fraser River system is the greatest, and at the same time the least expensive, reclamation project in which Canada and the United States can jointly engage, and if adequate measures are adopted its success is certain.

It is the purpose of this paper to briefly set forth what the sockeye-salmon fishery of the Fraser River system was, what it is to-day, and what it may again become by judicious conservation.

The prominent facts in the history of the sockeye-fishery may be stated as follows:—

(1.) The waters of the Fraser River system as defined in the treaty between Great Britain and the United States include all the fishing-waters in the Province of British Columbia and in the State of Washington which are frequented by sockeye salmon in their migration from the Pacific Ocean to the spawning-beds of the Fraser River basin. They include Juan de Fuca, Rosario, and Haro Straits, and the other American estuary waters leading into the Gulf of Georgia, and the waters of that gulf as well as the channels of the Fraser River up to Mission Bridge in British Columbia.

(2.) Fishing for sockeye began commercially in the channels of the Fraser in British Columbia in 1876. It was extended to the waters of the Gulf of Georgia immediately outside the mouths of the river in 1890. Fishing for sockeye began in the State of Washington waters in 1891, with the installation of traps in the vicinity of Point Roberts. Traps became an important factor in 1897. Purse-nets came into use in American waters in 1901 and in recent years have greatly increased in number. During the period of 1900 to 1918, when the industry was at its height, the catch of sockeye in Canadian waters produced a pack of 5,030,730 cases. During the same period the catch in American waters gave a pack of 7,382,343 cases. A combined total pack of 12,413,073 cases, of which the Canadians produced 40 per cent. and the Americans 60 per cent.

(3.) Dr. C. H. Gilbert, of Stanford University, in his "Contributions to the Life-history of the Sockeye" (*see* British Columbia Fisheries Reports, 1913 to 1918), has demonstrated by scale-reading that the sockeye that run in the Fraser River system are hatched in the watershed of that river in British Columbia, live for the first year or more of their lives in its lake waters, then migrate to the sea, where they remain and grow until the summer of their fourth year, and then seek to return to the Fraser River basin in order to spawn, and after spawning die.* Dr. Gilbert's findings are unquestioned by any authority.

(4.) The Fraser River basin formerly produced more sockeye salmon every fourth year—known as the "big year"—than any other known river-basin, and even in the following years—known as the "small years"—produced runs of commercial importance.

* There are, however, exceptional cases in which fish proceed to sea immediately on hatching, and there are certain proportions which return in their third and fifth year.

The following statement gives the entire pack of sockeye in American and Canadian waters of the Fraser River system for the years 1891 to 1919, inclusive:—

SOCKEYE-SALMON PACK OF FRASER RIVER SYSTEM, 1891 TO 1919, INCLUSIVE.

Year.	Canadian Waters.	American Waters.	Total.
	Cases.	Cases.	Cases.
1891	176,954	5,538	182,492
1892	79,715	2,954	82,669
1893	457,797	47,852	505,649
1894	363,967	41,791	405,758
1895	395,984	65,143	461,127
1896	356,984	72,979	429,963
1897	860,459	312,048	1,172,507
1898	256,101	252,000	508,101
1899	480,485	499,646	980,131
1900	229,800	228,704	458,504
1901	928,669	1,105,096	2,033,765
1902	293,477	339,556	633,033
1903	204,809	167,211	372,020
1904	72,688	123,419	196,107
1905	837,489	847,122	1,684,611
1906	183,007	182,241	365,248
1907	62,617	96,974	159,591
1908	74,574	155,218	229,792
1909	585,435	1,005,120	1,590,555
1910	150,432	234,437	384,869
1911	62,817	126,950	189,767
1912	123,879	183,896	307,775
1913	736,661	1,664,827	2,401,488
1914	198,183	336,251	534,434
1915	91,130	64,584	155,714
1916	27,394	78,476	105,870
1917	148,164	411,538	559,702
1918	19,697	50,723	70,420
1919	34,068	64,346	98,414
Totals	8,493,436	8,766,640	17,260,076

The foregoing table gives a complete record for six four-year cycles and for the first two years of the present cycle. The outstanding features therein shown are: (1) The great packs made every fourth year; (2) the comparatively small packs made in the three intervening years; (3) the gradual but pronounced decline in the runs in the small years; and (4) the startling decline in the pack in the last big year, 1917.

As far back as written records exist, a phenomenally big run of sockeye to the Fraser is shown every fourth year. All the early explorers record it, and quote the Indians as saying it had always existed. It has been a characteristic peculiar to the Fraser and unknown in any other river. Up to 1917 the Fraser River District produced more sockeye every fourth year than the combined catches made in Alaskan waters during all but one of those years, as the following statement shows:—

THE SOCKEYE-SALMON PACK OF THE FRASER RIVER SYSTEM AND IN ALASKA.

Year.	Alaska.	Fraser River System
	Cases.	Cases.
1901	1,319,335	2,033,765
1905	1,574,428	1,684,611
1909	1,705,302	1,590,555
1917	2,484,881	559,702

(5.) The sockeye-salmon runs to the Fraser River system in the big years have been alarmingly depleted, and the runs in the small years are no longer of commercial importance. Both are threatened with extinction.

Complete records exist of conditions on both the fishing and the spawning grounds of the Fraser system since 1900. The record of the pack shows the catch, because the entire catch is marketed in tins. The number of fishermen employed and the amount of gear used are also recorded. There are adequate data also for a comparison of conditions on the spawning-beds since 1900. Dr. Gilbert, in "The Sockeye Run on the Fraser River,"* says: "No other sockeye-stream has received such close and discriminating study. Annual inspection has been made of the spawning-beds of the entire watershed, and predictions of the run four years hence have been fearlessly made. It is a matter of record how consistently these prophecies have been fulfilled." The observations of conditions on the spawning-beds have been made by the same observer since 1900.

The records for the fishing-grounds show that the runs of sockeye to the Fraser River system in the big years 1901, 1905, 1909, and 1913 produced an average pack of 1,927,602 cases, and that in 1917, the last year in the cycle of big years, it produced a pack of but 559,732 cases, or 70 per cent. less than the average of the four preceding big years. The startling decrease in 1917 is due to the fact that the great spawning runs of 1913 did not reach the spawning-beds of the upper section of the Fraser basin, for the reason that the river's channel at Hell's Gate was blocked by a great slide of rock following the construction of the Canadian Northern Pacific Railway through the canyon of the Fraser. A tunnel was driven through the rock cliff that overhangs the narrow channel immediately above Hell's Gate. During the spring of 1913 the action of frost caused a section of that cliff, including a portion of the tunnel, to slide into the river's channel, which formed an obstruction that the main portion of the run of fish could not get over. After frantic and continued efforts to surmount the obstruction the fish became exhausted, and were swept down-stream by the rapid current, where they died in the channels below without having spawned.

The British Columbia Fisheries Report for 1913 states that the number of sockeye that escaped capture on the fishing-grounds, and that later reached Hell's Gate that year, was fully as great, if not greater, than in the four preceding big years. The conditions created at the principal spawning-beds of the Fraser by the obstruction is told in the following excerpt from the report of John P. Babcock, in the British Columbia Fisheries Report for 1913:—

"I feel fully justified from my investigations in concluding that the number of sockeye which passed above the fishing limits was as great this year as any preceding big year of which we have a record, and I think even greater. The sockeye made their appearance in the canyon above Yale in June, and during the high waters of that month and July large numbers passed through to Quesnel and Chilko Lakes. The greater proportion of the run of sockeye in late July, and in August and September, was blockaded in the canyon by rock-obstructions placed in the channel, incident to the construction of the Canadian Northern Pacific Railroad, so that few were able to pass through during that time. No humpbacks succeeded in passing through the canyon. The blasting of temporary passage-ways enabled a large proportion of the sockeye run of October and November to pass through the canyon. In August sockeye were seen drifting down-stream, between Hell's Gate and Yale; the movement was very pronounced in September, and continued until the middle of October. The streams which enter the Fraser between Hell's Gate and Agassiz were filled with sockeye from the middle of August until the end of October, while they had not been observed in those streams in previous years. Very few sockeye spawned in any of these streams and most of them died without spawning. Great numbers of dead sockeye, which had died without spawning, were found on the bars and banks of the Fraser between Yale and Agassiz in September and October. The number which reached Quesnel Lake was little more than an eighth of the number which entered that lake in 1909. The run to Chilko Lake was equally small. The sockeye run to Seton Lake was 30,000, as against 1,000,000 in 1909. The August and September run of sockeye to Shuswap and Adams Lakes was much less than in any former big year, and the October and November run was also less. The sockeye-eggs collected there this year totalled but 9,000,000, as against 27,500,000 four years ago and 18,000,000 in 1905. The run to Lillooet Lake was less than in any recent year. Finally, the run to Harrison Lake was slightly better than in 1909.

"These facts, in my opinion, warrant the conclusion that the number of sockeye which spawned in the Fraser River watershed this year was not sufficient to make the run four years hence even approximate the runs of either 1905, 1909, or 1913."

* British Columbia Fisheries Report, 1917.

The disastrous effect of the 1913 blockade was manifested on both the fishing and spawning grounds in 1917, since the run in the latter year was the product of the 1913 spawning. The catch of 1917 produced a pack of but 559,732 cases as against 2,401,488 cases, or 76 per cent. less than in 1913, notwithstanding the fact that more fishermen and more gear were employed than in 1917 and the price paid for fish was higher.

Small as was the catch of 1917, too great a proportion of the run of that year was captured. That is, a sufficient number of fish were not permitted to reach the spawning area. In place of the millions of sockeye that reached Hell's Gate in 1913, only hundreds of thousands reached there in 1917. The obstructions having been removed, the fish had no difficulty in passing through to the spawning-beds above. The numbers that passed through in 1917 were far less than in 1913, notwithstanding the blockade of the latter year. In place of the 4,000,000 that entered Quesnel Lake in 1909 and the 552,000 that entered its waters in 1913, less than 27,000 passed into that great spawning area in 1917, and the numbers that reached all the other great lake sections were proportionately less than in 1913.* The number of sockeye that reached the Fraser basin in 1917 was not, in most sections, greater than in some recent small years. The result of the spawning in 1917 will not produce in 1921 a run even approximately as great as that of 1917. In other words, it may be expected to be very much less. The great run of the big years was destroyed by the 1913 blockade. The remnant of that run cannot withstand the drain made upon it in 1917. It is already so small that it must hereafter be classed with the runs in the small years. And like the runs in the small years it will be completely wiped out if present conditions shall continue.

The runs of sockeye to the Fraser system in the small years are no longer of commercial importance. Dr. Gilbert, in his article entitled "The Sockeye Run on the Fraser River,"† says:—

"The history of the Fraser River sockeye runs show unmistakably that the three small years of each four-year cycle were overfished early in the history of the industry. During the early years, when fishing was confined to the regions about the mouth of the river and drift-nets alone were employed, no evidence exists of overfishing. The last cycle in which these conditions obtained was 1894-96. During each of the small years of that cycle (1894, 1895, and 1896) there were packed approximately 350,000 cases on the Fraser River and about 60,000 cases in Puget Sound. During each of those years, therefore, about 5,000,000 sockeye were taken from the spawning run and used for commercial purposes. It should have been considered at that time an open question whether enough salmon to keep the runs going had been permitted to escape to the spawning-grounds. Apparently, however, a third of a million cases a year could be safely spared, for the following cycle shows no decrease. If from the beginning the pack had been limited to a third of a million cases for each small year, apparently the runs would still have continued in their primitive abundance.

"During the following period of four years (1897, 1898, 1899, and 1900) the traps on Puget Sound became an important matter. While the British Columbia pack shows little or no reduction, it was met by a pack on Puget Sound which nearly equalled it. The total captures during the three off-years of this cycle nearly doubled those of the preceding years and exacted an average toll of about 10,000,000 fish from the spawning run of those years. The total pack of the three small years of this cycle was over 2,000,000 cases.

"The result was quickly apparent. If 5,000,000 fish could be safely spared, this figure nevertheless must have been near the upper limit of safety, for when 10,000,000 fish were abstracted the small years of the following cycle showed such a marked decline as to indicate that we had far overstepped the line of safety. It was then during the cycle of 1897-1900 that the first serious damage was done to the sockeye run of the Fraser River. By doubling the pack of the three small years, not only was the surplus fully taken, but the necessary spawning reserve was seriously encroached on, with the result that in the small years of the following cycle (1902, 1903, and 1904), in spite of the increased amount of gear employed, the pack was cut in half, while the spawning-beds at the same time were but sparsely seeded.

"The inevitable and disastrous trend of events should have been evident to the dullest. But the parties in interest refused to hold their hands and proceeded with the slaughter of the spawning remnant. The result was quickly apparent. In 1902, 1903, and 1904 the total sockeye-pack of the Fraser (river system) was cut to 1,200,000 cases, and in succeeding years

* British Columbia Fisheries Report, 1917, page 21.
† British Columbia Fisheries Report, 1917, pages 113-14.

it has suffered still further reduction. The pack of the three small years never again equalled 1,000,000 cases. In 1906-8 it was 750,000 cases; 1910-12, 880,000 cases; in 1914-16, 796,000. And with each year the amount of gear employed has increased by leaps and bounds. The small years of the present cycle may be expected to register a smaller total than any which have gone before."

The total catch of sockeye in the Fraser River system in the past two small years of the present cycle demonstrates the correctness of Dr. Gilbert's forecast. The catch of 1918 produced a pack of but 70,420 cases, as against 534,434 cases in the preceding fourth year; and the catch in 1919 gave a pack of but 84,063 cases, as against 155,714 cases in 1915.

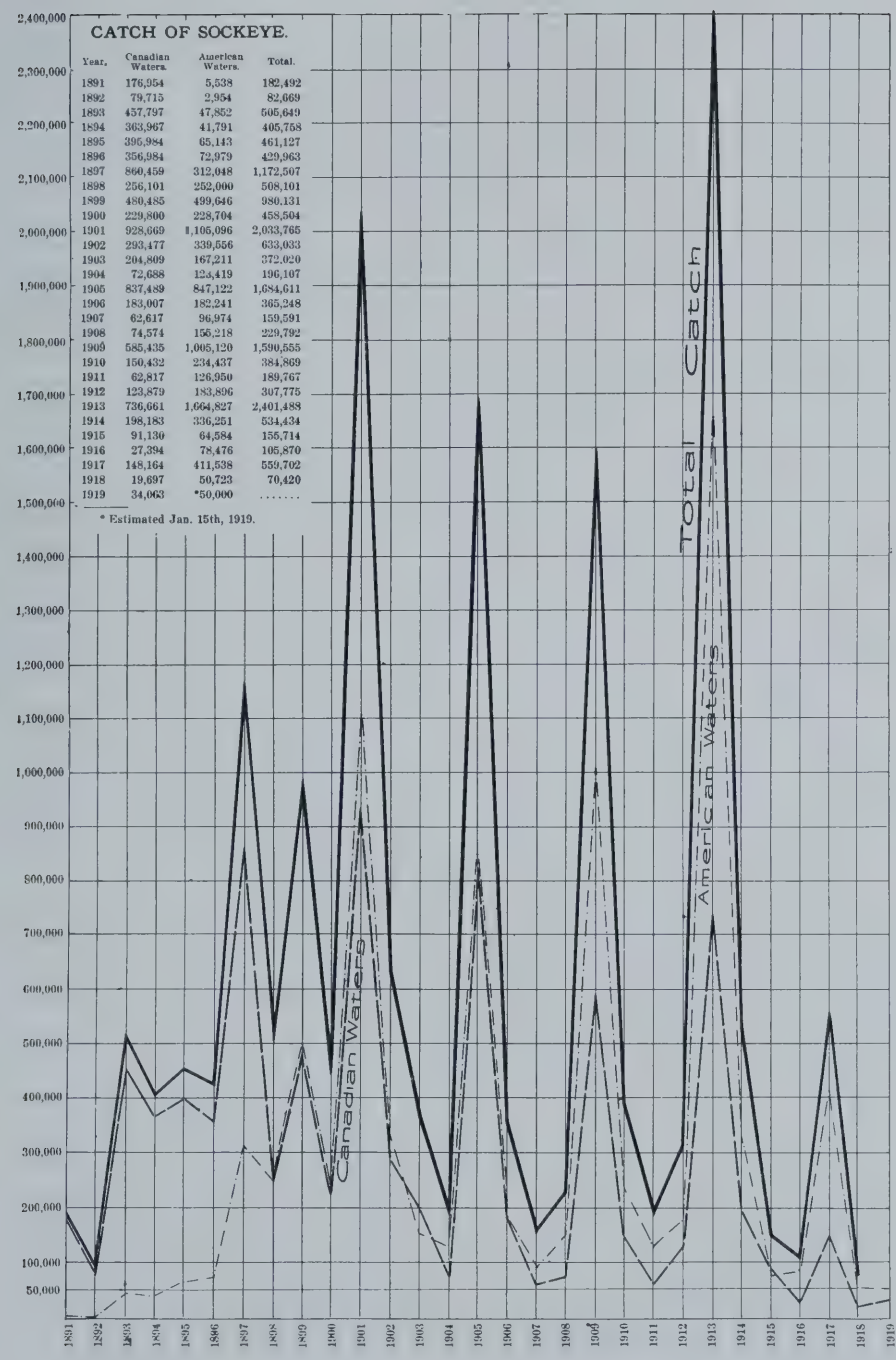
The evidence of the decline in the runs of sockeye in the Fraser River system is overwhelming. The runs in all years have already become so depleted that it is evident that under existing conditions the sockeye will be exterminated within a short period.

(6.) The Fraser River basin has an area of 90,903 square miles. It contains sixteen great lakes that have a total area of 2,351 square miles. No other river on the Pacific Coast drains so extensive an area of lake-water adapted to the propagation and rearing of sockeye. In the past it has produced greater runs of sockeye than any other river because this great spawning area was abundantly seeded every fourth year. It has been shown that sockeye spawn in streams tributary to lakes and on the shoals of lakes, and that their young remain in the lake-waters for a year or more after hatching and then migrate to the sea. Knowing that the sockeye were bred in the watershed of the Fraser, we therefore know that the great runs of sockeye in the big years 1901, 1905, 1909, and 1913 originated there. The runs of those years produced an average pack of 1,927,602 cases and at the same time afforded in the first three named years a sufficient number to seed the entire spawning area. Therefore the amount of the average pack of the big years 1901, 1905, 1909, and 1913 may be safely taken from the run without an overdraft, whenever the spawning-beds are as abundantly seeded as they were in 1901, 1905, and 1909. The spawning area of the Fraser has not been lessened or injured. Its spawning-beds have not been damaged or interfered with by settlement, factories, mining, or irrigation. Its gravel-beds and shoals are as extensive and as suitable for spawning as they ever were. Its lake-waters are as abundantly filled as ever with the natural food for the development of young sockeye. The channels of the Fraser are open and free to the passage of fish. All that is required to reproduce the great runs of the past is a sufficient number of spawning fish to seed the beds as abundantly as they were seeded in 1901, 1905, and 1909, and in former big years. The fishery cannot be restored in any other way.

Neither Canada nor the United States acting singly can provide measures that will ensure the seeding of the spawning-beds of the Fraser. That can only be done by concurrent action. Joint and uniform regulations that will afford free passage for the fish through both Canadian and American waters must be provided and made effective. Sufficient fish must be permitted to pass through the fishing-waters and to reach and seed the beds. The interests of both Canada and the United States in this question are great. It is not alone a Canadian question. It is not alone an American question. It is an international question, and cannot be dealt with except in an international way. Recognizing these facts, both Great Britain and the United States, as far back as 1908, signed a convention dealing with the Fraser River situation. This convention failed to receive the approval of the United States Senate and was withdrawn. But, as we have already seen, in the years that followed matters went from bad to worse, and in 1918 an International Commission was established, consisting of the Honourable Sir J. D. Hazen, Chief Justice of New Brunswick, G. J. Desbarats, Deputy Minister of Naval Service, Ottawa, and William A. Found, Superintendent of Fisheries for the Dominion of Canada, representing Great Britain; and the Honourable Wm. C. Redfield, Secretary of Commerce and Labour of the United States, Edward F. Sweet, Assistant Secretary of Commerce and Labour, Washington, D.C., and Dr. Hugh M. Smith, Commissioner of Fisheries for the United States, representing the United States. The Commission held sittings in Seattle, Wash., and Vancouver, B.C., during the summer of 1918, and in the fall of that year embodied in a report to their respective Governments their unanimous findings, which resulted in the convention of 1919. That convention provides for "the times, seasons, and methods of sockeye-salmon fishing in the Fraser River system" and for "the conduct of investigations into the life-history of the salmon, hatchery methods, spawning-ground conditions, and other related matters" by an International Fisheries Commission, to consist of four persons, two to be named by each of the high contracting

Hell's Gate Canyon, Fraser River. Spring of 1914. Showing the condition produced by the rock-slides of 1913 and 1914. The channel was restored in 1914. (*See* following illustration.)

Hell's Gate Canyon, Fraser River, 1915. The rock thrown into the channel of the Fraser by the rock-slides of 1913-1914 has been removed and the original channel entirely restored.



CATCH OF SOCKEYE SALMON.

Fraser River System, 1891 to 1919, inclusive.

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parties, and that the convention shall remain in force for fifteen years, and thereafter for two years from the date when either shall give notice of desire to terminate it. The convention has been signed by both Governments, approved by the Canadian Government, and is now awaiting the approval of the United States Senate.

The American Government up to 1918 had expended $125,000,000 on capital account to reclaim 1,100,000 acres of arid lands. The 100,000 persons that lived on the 25,000 farms of that area in 1917 produced a crop worth $50,000,000. The lake-waters of the Fraser River basin cover an area of 1,514,000 acres that when seeded by spawning sockeye as abundantly as they were seeded in 1897, 1901, 1905, and 1909 will produce annually a run of sockeye salmon from which may be taken sufficient fish to fill 1,927,602 cases, worth $30,000,000, without an overdraft on the run. The 1,514,000 acres of spawning area of the Fraser River basin are now almost as non-productive as were the 1,100,000 acres of arid lands of the United States before that Government expended $125,000,000 to bring them under cultivation. The spawning area of the Fraser basin requires no expenditure to bring it into bearing. Appropriations for capital expenditure and upkeep are not required. The workers do not require dwellings or implements. Cultivation is unnecessary. If permitted to reach the beds the fish will seed them, the young will feed themselves, furnish their own transportation to and from their feeding and maturing ranges in the open sea. The fish will do all the work necessary to produce a crop worth $30,000,000 a year, provided the Governments of Canada and the United States will furnish to a sufficient number of them safe passage through the fishing-grounds of the Fraser River system.

We repeat, in conclusion, that the restoration of the sockeye-salmon fisheries of the Fraser River system is the greatest reclamation project in which Canada and the United States can jointly engage, and that, too, with the least expense and most certain results.

UNIVERSITY OF ILLINOIS
MAR 19 1921

PACK OF BRITISH COLUMBIA SALMON, SEASON 1919.

COMPILED FROM DATA FURNISHED THE DEPARTMENT BY THE B.C. SALMON CANNERS' ASSOCIATION.

Names.	Sockeyes.	Red Springs.	Pink and White Springs.	Bluebacks and Steelheads	Cohoes.	Pinks.	Chums.	Grand Totals (Cases).
*FRASER RIVER DISTRICT—								
B.C. Packers' Association	14,274	8,073	2,870	5,633	11,478	14,665	45	57,038
J. H. Todd & Sons	2,615	752	77	332	2,648	4,524	1,410	12,358
J. H. Todd & Sons (Esquimalt)	4,405	.....	.....	.....	.....	.....	.....	4,405
Quathiaski Canning Co., Ltd.	1,613	.....	.....	.....	.....	....	.....	1,613
Gulf Islands Fishing & Can. Co., Ltd.	618	.....	.....	.....	.....	.....	.....	618
Sidney Canning Co., Ltd.	801	.....	.....	.....	.....	.....	.....	801
Sooke Harbour F'g. & Pk. Co., Ltd.	1,789	.....	.....	.....	.....	.....	.....	1,789
Gosse-Millerd Packing Co., Ltd.	3,859	767	1,025	175	5,870	2,131	7,820	21,647
M. DesBrisay & Co.	1,442	690	36	1,047	501	669	.....	4,385
St. Mungo Canning Co., Ltd.	1,593	997	.....	.....	5,854	4,174	.....	12,618
Great West Packing Co., Ltd.	1,535	297	78	717	3,335	1,932	210	8,104
Glen Rose Canning Co., Ltd.	1,491	734	.....	.....	3,148	3,300	409	9,082
Griffin Canning Co., Ltd.	147	40	10	7,318	41	129	18	7,703
Defiance Pack. Co., Ltd., Liqn.	1,029	589	200	335	6,239	2,114	1,103	11,609
Canadian Fishing Co., Ltd.	1,643	1,580	.....	384	139	5,725	4,703	14,174
Totals.	38,854	14,519	4,296	15,941	39,253	39,363	15,718	167,944
SKEENA RIVER DISTRICT—								
B.C. Packers' Association	36,689	4,271	2,266	1,177	10,424	23,508	7,260	85,595
Anglo B.C. Packing Co., Ltd.	28,686	1,538	1,024	353	2,396	14,755	8,598	57,350
J. H. Todd & Sons	10,949	7,305	1,026	.....	12,625	12,092	874	44,871
Kildala Packing Co., Ltd.	13,140	596	169	231	1,156	5,640	910	21,842
B.C. Canning Co., Ltd.	15,377	1,331	261	106	3,864	11,004	542	32,485
Northern B.C. Fisheries, Ltd.	16,919	938	332	315	1,505	11,884	1,501	33,394
Cassiar Packing Co., Ltd.	11,780	702	299	.....	448	6,074	353	19,656
Wallace Fisheries, Ltd.	24,602	619	.....	238	1,631	10,852	802	38,744
Canadian Fish & Cold Stor. Co., Ltd.	10,597	1,602	804	.....	1,085	7,141	2,932	24,161
Gosse-Millerd Packing Co., Ltd.	16,206	759	99	252	1,425	14,353	7,685	40,779
Totals.	184,945	19,661	6,280	2,672	36,559	117,303	31,457	398,877
RIVERS INLET DISTRICT—								
B.C. Packers' Association	15,510	288	58	.....	1,428	383	2,400	20,067
Anglo B.C. Packing Co., Ltd.	5,489	.....	85	.....	54	40	76	5,744
J. H. Todd & Sons	5,883	12	.....	.....	262	109	79	6,345
Provincial Canning Co., Ltd.	5,387	363	204	.....	3,678	1,446	1,741	12,634
B.C. Canning Co., Ltd.	7,247	79	55	.....	1,325	30	519	9,404
Kildala Packing Co., Ltd.	5,187	110	43	.....	1,255	5	1,204	7,804
Gosse-Millerd Packing Co., Ltd.	4,262	40	16	2	6	239	353	4,968
Wallace Fisheries, Ltd.	7,293	75	50	.....	1,030	4,236	717	13,401
Totals.	56,258	967	475	2	9,038	6,538	7,089	80,367
NASS RIVER DISTRICT—								
B.C. Packers' Association	5,893	693	442	280	1,488	2,197	961	11,954
Anglo B.C. Packing Co., Ltd.	8,399	286	236	200	1,265	9,760	8,313	28,459
Northern B.C. Fisheries, Ltd.	6,232	472	354	221	2,331	4,478	2,779	16,867
M. DesBrisay & Co.	4,692	900	.....	.....	4,521	11,342	10,610	32,065
Western Salmon Packers, Ltd.	3,043	57	134	88	1,295	2,172	1,378	8,167
Totals.	28,259	2,408	1,166	789	10,900	29,949	24,041	97,512
VANCOUVER ISLAND DISTRICT—								
J. H. Todd & Sons	.....	5,075	1,170	.....	12,000	14,900	2,200	35,345
Wallace Fisheries, Ltd.	2,498	1,808	343	.....	7,552	.....	38,030	50,231
Quathiaski Canning Co., Ltd.	.....	622	425	4,191	3,004	3,871	7,024	19,137
C. L. Packing Co., Ltd.	1,379	66	69	479	155	10,467	1,896	14,511
Clayoquot Sound Canning Co., Ltd.	2,565	1,010	87	.....	1,220	.....	3,353	8,235
Nanaimo Canning & Packing, Ltd.	.....	.....	.....	95	170	.....	7,411	7,676
Redonda Canning & Cold Storage Co.	.....	404	752	1,634	1,352	1,216	4,650	10,008
Gulf Islands Fishing & Can. Co., Ltd.	.....	88	195	2,246	1,161	596	1,719	6,005
Sidney Canning Co., Ltd.	.....	451	208	.....	3,231	3,488	3,744	11,122
Lummi Bay Packing Co., Ltd.	10	775	344	.....	363	69	11,355	12,916
Nootka Packing Co., Ltd.	.....	9,446	1,672	.....	3,179	.....	35,642	49,939
Gosse-Millerd Packing Co., Ltd.	.....	7,604	1,553	.....	2,088	28	6,889	18,162
Sooke Harbour Fg. & Pk. Co., Ltd.	.....	212	533	.....	8,295	8,514	1,729	19,283
Bamfield Fisheries, Ltd.	.....	915	186	.....	1,214	37	2,371	4,723
Totals.	6,452	28,476	7,537	8,645	44,984	43,186	128,013	267,293
OUTLYING DISTRICTS—								
B.C. Packers' Association	20,616	806	3,886	19	8,391	15,233	9,629	58,580
Anglo B.C. Packing Co., Ltd.	821	.....	2,522	.....	4,647	7,432	26,741	42,163
Gosse-Millerd Packing Co., Ltd.	2,892	567	.....	32	2,714	26,694	21,772	54,671
Kildala Packing Co., Ltd.	1,261	75	19	283	1,127	2,764	13,709	19,238
Wallace Fisheries, Ltd.	7,169	404	.....	.....	747	786	3,643	12,749
Northern B.C. Fisheries, Ltd.	8,016	71	249	370	7,578	18,226	33,757	68,267
Western Packers, Ltd.	13,902	59	.....	.....	5,508	38,104	10,533	68,106
Maritime Fisheries, Ltd.	.....	3,058	224	63	.....	639	25,012	28,996
Ocean Packing Co., Ltd.	.....	.....	.....	.....	358	.....	16,287	16,645
H. B. Babbington	.....	800	.....	.....	256	.....	.....	1,056
Preston Packing Co., Ltd.	.....	1,308	718	.....	3,610	422	4,634	10,692
Totals.	54,677	7,148	7,618	767	34,936	110,300	165,717	381,163
Grand Totals	369,445	73,179	27,372	28,816	175,670	346,639	372,035	1,393,156

* Pack of sockeye credited to Fraser River run.

STATEMENTS SHOWING THE SALMON-PACK OF THE PROVINCE, BY DISTRICTS AND SPECIES, FROM 1904 TO 1919, INCLUSIVE.

Fraser River.

	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.	1904.
Sockeye	38,854	19,697	148,164	32,146	91,130	198,183	719,796	123,879	58,487	150,432	585,435	74,574	59,815	183,007	837,489	72,688
Springs, Red	14,519	15,192	10,197	17,673	23,228	11,209	3,573	15,856	7,028	1,018	1,428	1,903	3,448	7,523	5,507	9,482
Springs, White	4,296	24,853	18,916	11,430	5,892	15,300	49	9,826	6,751	8,925	.....	2,263	557	.....	.....	.....
Chums	15,718	86,215	59,973	30,934	18,919	74,826	22,220	12,997	47,237	52,460	8,687	415	63,530	15,543	3,304	1,066
Pinks	39,363	18,388	134,442	840	138,305	6,272	20,773	574	142,101	128						
Cohoes	39,253	40,111	25,895	31,330	43,514	43,504	16,018	36,190	39,740	35,031	27,919	33,270	35,766	34,413	30,836	45,667
Steelhead Trout	328	4,395	4,951	3,129	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Blue Backs	15,613	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	167,944	208,857	402,538	127,472	320,519	349,294	782,429	199,322	301,344	247,994	623,469	112,425	163,116	240,486	877,136	128,903

Skeena River.

Sockeyes	184,945	123,322	65,760	60,293	116,533	130,166	52,927	92,498	131,066	187,246	87,901	139,846	108,413	86,384	84,717	93,404
Springs	25,941	22,931	16,285	20,933	15,273	11,740	26,436	23,833	17,942	9,785	12,469	13,842	10,378	20,138	14,598	20,621
Chums	31,457	22,573	21,516	17,121	5,769	8,329	.....	504	70	.....	28,120	45,404	25,217	38,991	7,523	30,529
Pinks	117,303	161,727	148,319	73,029	107,578	71,021	66,045	97,588	81,956	13,473						
Cohoes	36,559	38,759	38,456	47,409	32,190	16,378	18,647	39,835	23,376	11,531	12,249	10,085	15,247	16,897	7,247	10,315
Steelhead Trout	2,672	4,994	1,883	3,743	1,798	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Totals	398,877	374,306	292,219	223,158	279,161	237,634	164,055	254,258	254,410	222,035	140,739	209,177	159,255	162,420	114,085	154,869

Rivers Inlet.

Sockeyes	56,258	53,401	61,195	44,936	130,355	89,890	61,745	112,884	88,763	126,921	89,027	64,652	87,874	122,631	82,771	93,862
Springs	1,442	1,409	817	1,422	1,022	566	594	1,149	317	383	587	454	450	181	351	11
Chums	7,089	6,729	16,101	20,144	5,387	5,023	.....	3,845	288	.....	.....	.....	.....	.....	.....	.....
Pinks	6,538	29,542	8,065	3,567	2,964	5,784	2,097	8,809	5,411	19	.....	479	700	.....	.....	61
Cohoes	9,038	12,074	9,124	15,314	7,115	7,789	3,660	11,010	6,287	2,075	1,490	9,505	5,040	66	.....	358
Totals	80,367	103,155	95,302	85,383	146,838	109,052	68,096	137,697	101,066	129,398	91,014	75,090	94,064	122,878	83,122	94,292

Nass River.

Sockeyes	28,259	21,816	22,188	31,411	39,349	31,327	23,574	36,037	37,327	30,810	28,246	27,584	17,813	22,166	24,462	15,000
Springs	3,574	4,152	4,496	3,845	3,701	3,385	3,151	6,936	3,759	1,239	2,337	3,263	1,288	921	3,340	2,357
Chums	24,041	40,368	24,938	11,200	11,076	25,569	2,987	3,245	5,189	351	3,589	.....	.....	.....	.....	.....
Pinks	29,949	59,206	44,568	59,593	34,879	25,333	20,539	12,476	11,467	895	.....	6,612	5,957	3,450	1,840	31
Cohoes	10,900	17,061	22,180	19,139	15,171	9,276	3,172	12,468	7,942	6,285	6,818	8,348	6,093	5,997	3,083	1,697
Steelhead Trout	789	1,305	1,125	1,498	113	.....	.....	.....	.....	140	.....	1,101	681	.....	.....	.....
Totals	97,512	143,908	119,495	126,686	104,289	94,890	53,423	71,162	65,684	39,720	40,990	46,908	31,832	32,534	32,725	19,085

VANCOUVER ISLAND DISTRICTS.*

	1919.	1918.	1917.
Sockeyes	6,452	6,143	9,639
Springs	36,013	29,324	19,509
Chums	128,013	251,266	240,381
Pinks	43,186	57,035	49,156
Cohoes	53,629	40,752	31,733
Totals	267,293	389,815	325,723

OUTLYING DISTRICTS.

	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.	1904.
Sockeyes	54,677	51,980	32,902	45,373	98,660	87,130	149,336	79,464	67,866	70,506	49,832	48,367	40,159	45,481	51,234	48,272
Springs	14,766	8,582	6,056	11,423	9,488	7,108	7,246	22,837	12,659	7,439	2,196	6,439	9,977	3,581	4,563	2,950
Chums	165,717	90,464	112,364	160,812	40,849	70,727	52,758	37,734	39,167	5,551	.....	.....	.....	.....	.....	.....
Pinks	110,300	201,847	112,209	143,615	83,626	111,930	83,430	128,296	64,312	20,098	6,148	23,538	23,300	7,964	1,303	4,409
Cohoes	35,011	42,331	30,201	70,431	48,966	43,254	28,328	65,806	42,457	19,460	13,532	20,709	25,754	11,759	3,292	13,114
Steelhead Trout	702	1,009	865	712	985	.....	.....	.....	.....	.....	.....	36	2	.....	.....	.....
Totals	381,163	404,793	294,597	432,366	313,894	320,168	285,898	334,187	226,461	123,054	71,708	99,089	99,192	68,785	60,392	68,745

TOTAL PACKED BY DISTRICTS IN 1904 TO 1919, INCLUSIVE.

	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.	1904.
Fraser	167,944	210,851	402,538	127,472	320,519	349,294	782,429	199,322	301,344	247,994	623,469	112,425	163,116	240,486	877,136	128,903
Skeena	398,877	374,216	292,219	223,158	279,161	237,634	164,055	254,258	254,410	222,035	140,739	209,177	159,255	162,420	114,085	154,869
Rivers Inlet	80,367	103,155	95,302	85,383	146,338	109,052	68,096	137,697	101,066	129,398	91,014	75,090	94,064	122,878	83,122	94,292
Nass River	97,512	143,908	119,495	126,686	104,289	94,890	53,423	71,162	65,684	39,720	40,990	46,908	31,832	32,534	32,725	19,085
*Vancouver Island	267,293	389,815	325,723	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Outlying Districts	381,163	404,793	294,597	432,366	313,894	320,169	285,898	334,187	226,461	123,054	71,708	99,089	99,192	68,785	60,392	68,745
Grand totals	1,393,156	1,626,738	1,557,485	995,065	1,164,701	1,111,039	1,353,901	996,626	948,965	762,201	967,920	542,689	547,459	627,103	1,167,460	465,894

STATEMENTS SHOWING SALMON-PACK OF PUGET SOUND, BY SPECIES, FROM 1914 TO 1919.

	1919.	1918.	1917.	1916.	1915.	1914.	1913.	1912.	1911.	1910.	1909.	1908.	1907.	1906.	1905.	1904.
Sockeyes	64,346	50,723	411,538	84,637	87,465	357,374	1,665,728	201,572	140,529	234,437	1,005,120	162,228	96,974	182,241	837,122	123,419
Cohoes	210,883	235,860	114,276	155,832	180,799	151,135	49,150	149,977	244,208	154,077	139,297	95,863	111,611	98,206	89,636	106,856
Puget Sound Pinks	421,215	6,605	1,121,884	1,887	589,780	909	788,789	708	1,038,136	..	365,156	.....	448,730	.....	71,490	.....
Chums	525,541	267,538	216,285	427,878	410,687	280,070	50,176	63,132	111,143	148,810	52,251	51,186	51,840	155,221	49,047	56,355
Totals	1,221,985	560,726	1,863,983	670,234	1,268,731	789,488	2,553,843	415,389	1,534,016	537,324	1,561,824	309,277	709,155	435,668	1,047,295	286,630

* Previously the Vancouver Island pack was shown in Outlying Districts pack.

PROVINCE OF BRITISH COLUMBIA

DEPARTMENT OF ATTORNEY-GENERAL

REPORT

OF THE

INSPECTOR OF MUNICIPALITIES

FOR THE YEAR ENDING

DECEMBER 31ST, 1919

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

I have the honour to transmit herewith the Annual Report of the Inspector of Municipalities for the year ending December 31st, 1919.

All of which is respectfully submitted.

J. W. DE B. FARRIS,

Attorney-General.

Victoria, August 1st, 1920.

REPORT OF INSPECTOR OF MUNICIPALITIES.

VICTORIA, B.C., August 1st, 1920.

Hon. J. W. de B. Farris,
Attorney-General.

SIR,—I submit herewith statistical report showing the results of the financial activities of the various municipalities of the Province for the year 1919.

The report is of particular interest in view of the fact that in the year 1919 the first serious effort was made to clear up the large amount of arrears of taxes outstanding, much of which was on account of the extent of the accumulation rapidly becoming uncollectable. The amending Act of 1919 re-enacted in whole the taxation and tax-collection provisions of the "Municipal Act," and provided for a compulsory annual tax sale and also for the obtaining of a tax-sale title without delay and at very little cost. The full result of this policy will not be seen from the figures covering the first year of which we have complete record; the arrears of taxes show a decrease, the decrease being from $14,631,216.65 at the end of 1918 to $12,094,121.37 at the end of 1919. The figures submitted also show that the moneys actually received exceed the expenditures by $1,119,670. For a number of years previous the expenditures had steadily exceeded the receipts, in the year 1918 their excess being $1,884,475.19.

The sinking funds still show an alarming shortage, being $5,289,012.15, as compared with $5,206,093.14 at the end of the previous year, but from an examination of the comparative statement shown under the heading of "Sinking Funds" it will be seen that in a very large number of the municipalities there has been a satisfactory recovery.

The statements which I submit herewith are:—

I.—Assessments, 1920.
II.—Tax Levy, 1920.
III.—Liabilities as of December 31st, 1919.
IV.—Sinking Funds as of December 31st, 1919.
V.—Arrears of Taxes.
VI.—Particulars of Receipts for the Year 1919.
VII.—Particulars of Expenditures for the Year 1919.
VIII.—Particulars of Several Amounts of Taxes levied in 1919.
IX.—Comparative Statement of the Receipts from Principal Sources of Revenue for the Years 1914 to 1919.
X.—Comparative Statement of Expenditures on Streets, Fire, Administration of Justice, Public Health, and Council Salaries, 1914 to 1919.
XI.—Financial Statement of Public Utilities of the Municipalities of the Province.

ROBERT BAIRD,
Inspector of Municipalities.

I.—ASSESSMENTS, 1920.

CITIES.

Municipality.	Value of Taxable Land.	Value of Taxable Improvements.	Total Taxable Property.	Land and Improvements exempt from Taxation.	Grand Total.	Percentage Improvements Taxed.	Population.	Area in Acres.
Alberni	$ 851,875 00	$ 253,950 00	$ 1,105,825 00	$ 17,280 00	$ 1,123,105 00	*Nil*	500	1,553
Armstrong	591,867 00	497,110 00	1,088,977 00	9,000 00	1,097,977 00	50	1,100	1,000
Chilliwack	884,710 00	883,950 00	1,768,660 00	233,075 00	2,001,735 00	*Nil*	2,000	1,040
Courtenay	552,969 00	230,250 00	783,219 00	15,200 00	798,419 00	50	770	800
Cranbrook	613,325 00	1,057,900 00	1,671,225 00	.....	1,671,225 00	50	3,000	200
Cumberland	129,040 00	245,215 00	374,255 00	45,000 00	419,255 00	*Nil*	1,500	40
Duncan	755,520 00	389,100 00	1,144,620 00	134,430 00	1,279,050 00	50	1,200	500
Enderby	382,154 00	333,310 00	715,464 00	139,360 00	854,824 00	50	970	655
Fernie	895,960 00	1,295,696 00	2,191,656 00	549,360 00	2,741,016 00	50	5,000	331
Grand Forks	707,015 00	592,340 00	1,299,355 00	420,295 00	1,719,650 00	50	2,000	1,697
Greenwood	152,645 00	79,104 00	231,749 00	291,061 00	522,810 00	33⅓	800	640
Kamloops	2,560,866 00	1,819,410 00	4,380,276 00	886,941 00	5,267,217 00	25	4,000	912
Kaslo	194,801 00	257,320 00	452,121 00	148,505 00	600,626 00	50	1,370	400
Kelowna	1,640,218 00	1,450,450 00	3,090,668 00	347,175 00	3,437,843 00	25	2,650	1,281
Ladysmith	392,745 00	446,050 00	838,795 00	99,900 00	938,695 00	*Nil*	2,850	220
Merritt	566,122 00	.....	566,122 00	103,985 00	670,107 00	*Nil*	1,800	1,615
Nanaimo	2,377,670 00	2,862,270 00	5,239,940 00	399,800 00	5,639,740 00	*Nil*	7,800	720
Nelson	1,768,839 00	2,683,080 00	4,451,919 00	536,935 00	4,988,854 00	*Nil*	5,500	483
New Westminster	10,633,586 00	9,827,525 00	20,461,111 00	6,283,715 00	26,744,826 00	50*	17,000	3,481
North Vancouver	9,837,667 74	3,744,636 00	13,582,303 74	842,365 00	14,424,668 74	*Nil*	8,100	2,750
Phoenix	132,500 00	140,030 00	272,530 00	.....	272,530 00	50	860	148
Port Alberni	1,018,368 00	.....	1,018,368 00	126,056 00	1,144,424 00	*Nil*	750	1,960
Port Coquitlam	4,025,598 00	521,800 00	4,547,398 00	1,053,184 00	5,600,582 00	*Nil*	1,200	6,200
Port Moody	1,772,230 00	886,845 00	2,659,075 00	51,553 00	2,710,628 00	*Nil*	2,000	3,000
Prince George	2,130,124 00	.....	2,130,124 00	.....	2,130,124 00	*Nil*	1,380	1,092
Prince Rupert	12,912,097 50	2,981,206 00	15,893,303 50	3,210,032 50	19,103,336 00	*Nil*	4,000	2,240
Revelstoke	1,387,540 00	1,282,450 00	2,669,990 00	644,890 00	3,314,880 00	50	4,200	595
Rossland	608,467 00	1,213,465 00	1,821,932 00	652,835 00	2,474,767 00	50	3,600	1,920
Salmon Arm	466,500 00	339,970 00	806,470 00	82,980 00	889,450 00	50	750	520
Slocan	58,040 00	61,012 00	119,052 00	29,042 00	148,094 00	*Nil*	430	192
Trail	511,175 00	1,306,950 00	1,818,125 00	128,182 00	1,946,307 00	50	4,000	664
Vancouver	133,954,010 00	73,652,920 00	207,606,930 00	.....	207,606,930 00	50	115,500	10,784
Vernon	2,172,084 00	1,580,895 00	3,752,979 00	684,410 00	4,437,389 00	40	3,000	2,000
Victoria	46,108,278 00	25,788,790 00	71,897,068 00	4,247,940 00	76,145,008 00	*Nil*	39,500	4,637
Totals	$243,746,606 24	$138,704,999 00	$382,451,605 24	$22,414,486 50	$404,866,091 74	...	251,080	56,276

* Fifty per cent. of the assessed value of improvements only on leased land.

DISTRICTS.

Municipality.	Value of Taxable Land.	Value of Taxable Improvements.	Total Taxable Property.	Land and Improvements exempt from Taxation.	Grand Total.	Percentage Improvements Taxed.	Population.	Area in Acres.
Burnaby	$ 13,616,098 00	$ 3,423,995 00	$ 17,040,093 00	$ 3,412,740 00	$ 20,452,833 00	*Nil*	9,680	21,500
Chilliwhack	3,290,385 00	821,950 00	4,112,335 00	.....	4,112,335 00	*Nil*	5,000	45,000
Coldstream	1,064,998 00	1,381,289 00	2,446,287 00	.....	2,446,287 00	*Nil*	325	17,000
Coquitlam	2,076,669 00	.....	2,076,669 00	62,377 00	2,139,046 00	*Nil*	1,200	37,120
Delta	5,674,015 00	983,195 00	6,657,210 00	.....	6,657,210 00	*Nil*	3,500	42,000
Esquimalt	4,659,205 00	1,728,425 00	6,387,630 00	567,350 00	6,954,980 00	*Nil*	4,000	1,500
Fraser Mills	142,920 00	319,939 00	462,859 00	.....	462,859 00	50	900	390.46
Kent	773,974 55	.....	773,974 55	.....	773,974 55	*Nil*	750	47,360
Langley	2,235,996 00	2,037,103 00	4,273,099 00	53,700 00	4,326,799 00	*Nil*	2,500	75,907
Maple Ridge	1,776,820 00	1,024,380 00	2,801,200 00	51,615 00	2,852,815 00	50	3,000	45,000
Matsqui	2,411,508 00	2,181,281 00	4,592,789 00	4,840,400 00	9,433,189 00	50*	2,000	54,145
Mission	1,921,266 00	511,315 00	2,432,581 00	35,384 00	2,467,965 00	50	2,500	52,000
North Cowichan	2,950,619 00	2,672 228 00	5,622,847 00	42,625 00	5,665,472 00	10	3,000	35,000
North Vancouver	6,663,152 00	2,151,440 00	8,814,592 00	1,747,950 00	10,562,542 00	*Nil*	3,080	48,000
Oak Bay	5,138,087 00	3,179,570 00	8,317,657 00	111,250 00	8,428,907 00	*Nil*	4,000	2,552
Peachland	296,545 00	222,250 00	518,795 00	16,530 00	535,325 00	50†	600	3,520
Penticton	1,939,610 00	1,441,195 00	3,380,805 00	512,902 00	3,893,707 00	*Nil*	2,740	7,044
Pitt Meadows	1,164,893 00	240,925 00	1,405,818 00	3,250 00	1,409,068 00	50	300	14,000
Point Grey	19,972,485 91	10,304,585 00	30,277,070 91	446,694 00	30,723,764 91	*Nil*	9,800	12,000
Richmond	4,848,438 00	874,602 00	5,723,040 00	120,792 00	5,843,832 00	50	3,110	30,000
Saanich	11,013,821 00	4,624,480 00	15,638,301 00	479,032 00	16,117,333 00	*Nil*	8,700	45,000
Salmon Arm	769,767 00	798,585 00	1,568,352 00	26,950 00	1,595,302 00	*Nil*	4,000	46,080
South Vancouver	15,599,068 65	8,629,183 00	24,228,251 65	1,868,729 00	26,096,980 65	45	37,000	9,200
Spallumcheen	2,011,675 00	614,110 00	2,625,785 00	.....	2,625,785 00	*Nil*	3,000	65,000
Sumas	729,771 00	104,430 00	834,201 00	14,000 00	848,201 00	50	475	19,100
Summerland	1,307,203 14	1,837,773 00	3,144,976 14	67,550 00	3,212,526 14	*Nil*	1,600	13,000
Surrey	3,887,656 00	1,757,700 00	5,645,356 00	.....	5,645,356 00	*Nil*	5,500	76,000
West Vancouver	1,825,267 00	1,859,782 00	3,685,049 00	175,790 00	3,860,839 00	*Nil*	1,400	24,320
Totals	$119,761,913 25	$ 55,725,710 00	$175,487,623 25	$14,657,610 00	$190,145,233 25	...	123,660	888,738.46
Cities forward	243,746,606 24	138,704,999 00	382,451,605 24	22,414,486 50	404,866,091 74	...	251,080	56,270
Cities and districts	$363,508,519 49	$194,430,709 00	$557,939,288 49	$37,072,096 50	$595,011,324 99	...	374,740	945,008.46

* Taxes levied upon 50 per cent. of assessed value of improvements which exceed $8,000.
† In special area only for fire protection.

II.—TAX LEVY, 1920.

CITIES.

Municipality.	General.	School.	Debt.	Total.	Total Levy Previous Year.
Alberni	17.0	4.0	9.0	30.0	30.0
Armstrong	15.0	10.0	4.0	29.0	23.0
Chilliwack	20.0	18.0	13.5	51.5	43.0
Courtenay	12.0	4.5	4.5	21.0	14.5
Cranbrook	20.0	13.8	16.2	50.0	39.0
Cumberland	20.0	19.0	....	39.0	28.0
Duncan	5.0	10.0	13.5	28.5	31.0
Enderby	12.5	11.5	14.0	38.0	31.0
Fernie	14.6	23.2	6.17	43.97	39.02
Grand Forks	8.0	7.0	15.0	30.0	30.0
Greenwood	6.0	19.0	39.0	64.0	52.0
Kamloops	.....	8.5	33.5	42.0	47.0
Kaslo	14.0	20.68	4.32	39.0	36.5
Kelowna	11.3	13.6	12.6	37.5	36.0
Ladysmith	5.0	20.0	5.0	30.0	27.0
Merritt	9.0	10.0	16.0	35.0	35.0
Nanaimo	11.86	16.04	17.1	45.0	40.0
Nelson	10.0	14.5	15.5	40.0	37.5
New Westminster	2.0	12.0	22.0	36.0	32.0
North Vancouver	12.15	8.1	9.75	30.0	28.0
Phoenix	4.0	1.0	....	5.0	23.0
Port Alberni	7.8	10.4	19.8	38.0	33.6
Port Coquitlam	8.0	2.54	11.56	22.1	17.12
Port Moody	16.34	3.66	5.0	25.0	20.0
Prince George	11.5	4.5	9.0	25.0	25.0
Prince Rupert	11.5043	6.58	7.0842	25.1685	13.75
Revelstoke	12.0	12.0	7.0	31.0	33.0
Rossland	1.0	20.0	19.0	40.0	36.0
Salmon Arm	8.5	7.5	14.0	30.0	29.0
Slocan	20.0	10.0	7.0	37.0	33.0
Trail	20.0	11.5	7.9	39.4	33.0
Vancouver	14.711	8.026	8.929	31.666	26.6666
Vernon	8.0	10.0	19.0	37.0	34.0
Victoria	6.6	8.6	10.8	26.0	26.85

Districts.

Municipality.	General.	School.	Debt.	Total.	Total Levy Previous Year.
Burnaby	8.73 (22.45)	8.03 (8.76)	12.24 (16.79)	29.0 (48)	24.0 (48)
Chilliwhack	10.0	10.73	.....	20.73	16.36
Coldstream	11.3	2.9	9.2	23.4	22.2
Coquitlam	7.0 (12)	2.2	2.7	11.9 (16.9)	11.87 (16.87)
Delta	7.5	2.75	2.75	13.0	10.75 (21)
Esquimalt	11.25	5.75	.....	17.0	18.0
Fraser Mills	9.0	.....	.....	9.0	9.0
Kent	5.0 (30)	5.0	.....	10.0 (35)	9.0 (30)
Langley	11.0 (42)	8.0	.....	19.0 (50)	14.0 (47)
Maple Ridge	15.0 (45)	4.5	.....	19.5 (49.5)	16.5 (49.5)
Matsqui	11.0 (25)	6.0	.....	17.0 (31)	12.5 (29.5)
Mission	16.0 (50)	5.0	.....	21.0 (55)	15.0
North Cowichan	4.0	3.0	1.0	8.0 (25)	5.0
North Vancouver	12.0	5.6	7.6	25.2	20.6
Oak Bay	12.24	10.12	2.64	25.0	18.9
Peachland	12.0	15.0	9.0	36.0	27.0
Penticton	20.0	15.0	11.0	46.0	35.0
Pitt Meadows	8.5	1.5	.....	10.0 (25)	6.7 (26.7)
Point Grey	*9.32 (17.32)	5.33	17.35	32.0 (40)	28.0 (38)
Richmond	11.65	5.1	3.25	20.0	18.0
Saanich	9.39	6.02	4.59	20.0	14.75
Salmon Arm	15.0	9.0	1.25	25.25 (20)	17.33 (20)
South Vancouver	11.96 (20.56)	13.97	15.47	41.4 (50)	41.4 (50)
Spallumcheen	5.5	5.7	0.75	11.95	10.75
Sumas	12.0	7.0	.....	19.0	17.0
Summerland	13.0	17.0	15.0	45.0	33.0
Surrey	14.0 (30)	7.0	.....	21.0 (37)	15.0 (29)
West Vancouver	14.6	4.4	11.0	30.0	26.0

Bracketed amounts represent tax on wild land.
* One mill additional on Shaughnessy Heights area.

	Housing	Total Debenture Debt.	Sundry Outstanding Debts Exclusive of Shortage in Sinking Fund.	Grand Total.
	.....	$ 70,130 00	$ 22 93	$ 70,152 93
Albern	.....	142,665 61	2,577 74	145,243 35
Armstr	.....	212,045 29	.....	212,045 29
Chilliw	.....	20,000 00	6,059 42	26,059 42
Courte	.....	343,242 67	21,384 95	364,627 62
Cranbr	.....	.....	559 59	559 59
Cumbe	.....	138,100 00	1,380 47	139,480 47
Dunca	.....	90,000 00	4,700 00	94,700 00
Enderl	.....	420,134 39	.....	420,134 39
Fernie	.....	131,800 00	903 80	132,703 80
Grand	.....	85,000 00	.....	85,000 00
Greenw	30,000 00	1,257,373 51	23,625 66	1,280,999 17
Kamlo	.....	54,000 00	203 59	54,203 59
Kaslo	.....	428,309 00	2,244 19	430,553 19
Kelowi	.....	96,477 00	2,583 60	99,060 60
Ladysr	.....	103,000 00	3,092 97	106,092 97
Merrit	.....	1,042,524 87	55,736 68	1,098,261 55
Nanair	.....	672,742 19	19,179 26	691,921 45
Nelson	.....	5,867,462 84	647,871 75*	6,515,334 59
New V	25,000 00	2,959,424 00	430,890 43	3,390,314 43
North	.....	6,000 00	.....	6,000 00
Phoen	.....	236,500 00	557 17	237,057 17
Port A	.....	426,500 00	98,553 61	525,053 61
Port C	.....	173,300 00	132,844 44†	306,144 44
Port N	20,000 00	233,000 00	14,888 04	247,888 04
Prince	75,000 00	1,709,222 90	50,912 32	1,760,135 22
Prince	.....	718,502 51	11,000 00	729,502 51
Revels	.....	166,000 00	600 00	166,600 00
Rossla	.....	134,000 00	1,858 14	135,858 14
Salmo	.....	4,800 00	51 80	4,851 80
Slocan	.....	221,400 00	25,475 34	246,875 34
Trail	50,000 00	35,349,011 84	3,942,941 59	39,291,953 43
Vanco	.....	867,763 28	6,985 93	874,749 21
Verno	.....	18,200,694 66	1,709,692 66‡	19,910,387 32
Victor				
	00,000 00	$72,581,126 56	$7,219,378 07	$ 79,800,504 63

III.—LIABILITIES AS OF DECEMBER 31st, 1919.

Cities.

Municipality.	Debentures.									Total Debenture Debt.	Sundry Outstanding Debts Exclusive of Shortage in Sinking Fund.	Grand Total.
	Schools.	Streets and Bridges.	Other Non-revenue Producing.	Waterworks.	Electric Light.	Sewers (Revenue-Producing.)	Other Revenue-Producing.	Local Improvements.	Better Housing			
Alberni	.....	.....	$ 8,000 00	$ 52,130 00	$ 10,000 00	.....	.....	.....	.....	$ 70,130 00	$ 22 93	$ 70,152 93
Armstrong	$ 5,500 00	$ 12,815 61	4,100 00	41,000 00	79,250 00	.....	.....	.....	.....	142,665 61	2,577 74	145,243 35
Chilliwack	33,500 00	75,500 00	83,000 00	.....	.....	.....	.....	$ 20,045 29	.....	212,045 29	.....	212,045 29
Courtenay	.....	.....	.....	.....	20,000 00	.....	.....	.....	.....	20,000 00	6,059 42	26,059 42
Cranbrook	28,281 57	18,246 00	143,339 60	153,375 50	.....	.....	.....	.....	.....	343,242 67	21,384 95	364,627 62
Cumberland	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	559 59	559 59
Duncan	21,000 00	10,000 00	14,000 00	25,000 00	65,000 00	.....	.....	3,100 00	.....	138,100 00	1,380 47	139,480 47
Enderby	27,500 00	.....	21,500 00	22,500 00	.....	.....	.....	18,500 00	.....	90,000 00	4,700 00	94,700 00
Fernie	52,000 00	15,000 00	88,500 00	119,000 00	74,000 00	$ 67,000 00	.....	4,634 39	.....	420,134 39	.....	420,134 39
Grand Forks	6,500 00	19,000 00	30,500 00	65,800 00	10,000 00	.....	.....	.....	.....	131,800 00	903 80	132,703 80
Greenwood	.....	25,500 00	21,400 00	38,100 00	.....	.....	.....	.....	.....	85,000 00	.....	85,000 00
Kamloops	63,500 00	15,000 00	122,500 00	329,000 00	220,500 00	.....	$ 345,000 00	131,873 51	$ 30,000 00	1,257,373 51	23,625 66	1,280,999 17
Kaslo	15,500 00	6,000 00	.....	1,500 00	31,000 00	.....	.....	.....	.....	54,000 00	203 59	54,203 59
Kelowna	61,500 00	15,500 00	144,500 00	.....	.....	.....	155,500 00	51,309 00	.....	428,309 00	2,244 19	430,553 19
Ladysmith	.....	.....	.....	.....	25,000 00	60,000 00	.....	11,477 00	.....	96,477 00	2,583 60	99,060 60
Merritt	3,000 00	10,000 00	20,000 00	45,000 00	25,000 00	.....	.....	.....	.....	103,000 00	3,092 97	106,092 97
Nanaimo	50,000 00	55,000 00	36,000 00	332,500 00	.....	230,000 00	.....	339,024 87	.....	1,042,524 87	55,736 68	1,098,261 55
Nelson	75,000 00	40,000 00	50,000 00	22,500 00	300,000 00	27,500 00	131,000 00	26,742 19	.....	672,742 19	19,179 26	691,921 45
New Westminster	389,000 00	1,264,000 00	1,728,037 00	916,500 00	206,000 00	.....	.....	1,363,925 84	.....	5,867,462 84	647,871 75*	6,515,334 59
North Vancouver	415,730 00	246,500 00	604,669 00	494,000 00	.....	.....	.....	935,525 00	25,000 00	2,959,424 00	430,890 43	3,390,314 43
Phoenix	.....	6,000 00	.....	.....	.....	.....	.....	.....	.....	6,000 00	.....	6,000 00
Port Alberni	.....	20,000 00	6,500 00	170,000 00	40,000 00	.....	.....	.....	.....	236,500 00	557 17	237,057 17
Port Coquitlam	35,000 00	237,500 00	54,000 00	100,000 00	.....	.....	.....	.....	.....	426,500 00	98,553 61	525,053 61
Port Moody	.....	.....	43,000 00	80,000 00	.....	.....	.....	50,300 00	.....	173,300 00	132,844 44†	306,144 44
Prince George	.....	34,000 00	18,000 00	97,000 00	64,000 00	.....	.....	.....	20,000 00	233,000 00	14,888 04	247,888 04
Prince Rupert	20,000 00	.....	151,330 53	389,905 82	242,005 01	.....	30,338 67	800,642 87	75,000 00	1,709,222 90	50,912 32	1,760,135 22
Revelstoke	48,000 00	63,000 00	101,430 59	56,700 00	276,145 00	.....	.....	173,226 92	.....	718,502 51	11,000 00	729,502 51
Rossland	30,000 00	52,500 00	52,000 00	31,500 00	.....	.....	.....	.....	.....	166,000 00	600 00	166,600 00
Salmon Arm	1,500 00	.....	5,500 00	85,000 00	42,000 00	.....	.....	.....	.....	134,000 00	1,858 14	135,858 14
Slocan	.....	.....	4,800 00	.....	.....	.....	.....	.....	.....	4,800 00	51 80	4,851 80
Trail	46,500 00	.....	19,500 00	98,900 00	.....	.....	.....	56,500 00	.....	221,400 00	25,475 34	246,875 34
Vancouver	4,146,900 00	7,242,600 00	9,544,800 00	4,749,351 20	.....	.....	.....	9,615,360 64	50,000 00	35,349,011 84	3,942,941 59	39,291,953 43
Vernon	47,500 00	70,300 00	97,000 00	240,000 00	189,000 00	.....	.....	223,963 28	.....	867,763 28	6,985 93	874,749 21
Victoria	1,424,668 71	175,000 00	4,073,332 84	4,186,408 94	.....	.....	.....	8,341,284 17	.....	18,200,694 66	1,709,692 66‡	19,910,387 32
Totals	$7,047,580 28	$ 9,728,961 61	$17,291,239 56	$12,942,671 46	$1,918,900 01	$ 384,500 00	$ 899,838 67	$22,167,434 97	$200,000 00	$72,581,126 56	$7,219,378 07	$ 79,800,504 63

Districts.

Burnaby	$ 293,400 00	$ 1,252,200 00	.....	$ 644,650 00	.....	.....	.....	.....	.....	$ 2,190,250 00	$ 500,651 33	$ 2,690,901 33
Chilliwhack	15,000 00	.....	.....	.....	.....	.....	.....	.....	.....	15,000 00	6,992 21	21,992 21
Coldstream	.....	14,500 00	$ 1,200 00	120,000 00	.....	.....	.....	.....	.....	135,700 00	923 14	136,623 14
Coquitlam	.....	82,500 00	.....	8,175 42	.....	.....	.....	.....	.....	90,675 42	.....	90,675 42
Delta	.....	.....	15,000 00	205,000 00	.....	.....	.....	$ 112,466 99	.....	332,466 99	1,405 20	333,872 19
Esquimalt	27,500 00	.....	.....	.....	.....	$ 400,000 00	.....	.....	$ 7,000 00	434,500 00	5,500 00	440,000 00
Kent	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	313 10	313 10
Langley	.....	.....	.....	.....	.....	.....	.....	.....	5,500 00	5,500 00	2,312 00	7,812 00
Maple Ridge	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	1,769 04	1,769 04
Matsqui	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8 28	8 28
Mission	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	5,002 96	5,002 96
North Cowichan	.....	35,000 00	.....	.....	.....	.....	.....	.....	.....	35,000 00	333 75	35,333 75
North Vancouver	62,000 00	507,243 00	411,757 00	194,725 00	.....	.....	.....	137,070 50	32,000 00	1,344,795 50	40,480 09	1,385,275 59
Oak Bay	65,000 00	.....	96,000 00	200,000 00	.....	425,000 00	.....	480,224 46	.....	1,266,224 46	55,903 68	1,322,128 14
Peachland	1,000 00	.....	3,500 00	9,500 00	$ 18,800 00	.....	.....	5,200 00	.....	38,000 00	5,123 64	43,123 64
Penticton	32,700 00	42,000 00	41,800 00	168,000 00	162,000 00	.....	$ 145,000 00	13,500 00	5,000 00	610,000 00	32,659 15	642,659 15
Point Grey	410,031 66	1,987,935 15	1,896,859 27	1,446,998 40	.....	.....	.....	4,000 89	40,000 00	5,785,825 37	47,631 01	5,833,456 38
Richmond	28,000 00	303,800 00	.....	365,000 00	.....	.....	.....	81,521 50	.....	778,321 50	10,333 79	788,655 29
Saanich	33,500 00	450,000 00	.....	419,500 00	.....	.....	.....	113,679 31	40,000 00	1,056,679 31	22,589 53	1,079,268 84
Salmon Arm	.....	.....	10,000 00	.....	.....	.....	.....	.....	.....	10,000 00	1,450 53	11,450 53
South Vancouver	1,002,644 10	3,436,186 40	450,000 00	1,013,050 00	.....	.....	.....	784,284 71	20,000 00	6,706,165 21	1,550,336 08	8,256,501 29
Spallumcheen	25,000 00	.....	16,500 00	.....	.....	.....	.....	56,885 00	.....	98,385 00	.....	98,385 00
Sumas	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	973 92	973 92
Summerland	11,300 00	24,000 00	6,000 00	384,000 00	21,500 00	.....	.....	.....	.....	446,800 00	34,024 30	480,824 30
Surrey	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	8,947 35	8,947 35
West Vancouver	38,200 00	431,000 00	40,000 00	125,000 00	.....	.....	146,000 00	.....	.....	780,200 00	.....	780,200 00
Totals	$2,045,275 76	$ 8,566,364 55	$ 2,988,616 27	$ 5,303,598 82	$ 202,300 00	$ 825,000 00	$ 291,000 00	$ 1,788,833 36	$149,500 00	$22,160,488 76	$2,335,664 08	$ 24,496,152 84
Cities forward	7,047,580 28	9,728,961 61	17,291,239 56	12,942,671 46	1,918,900 01	384,500 00	899,838 67	22,167,434 97	200,000 00	72,581,126 56	7,219,378 07	79,800,504 63
Cities and districts	$9,092,856 04	$18,295,326 16	$20,279,855 83	$18,246,270 28	$2,121,200 01	$1,209,500 00	$1,190,838 67	$23,956,268 33	$349,500 00	$94,741,615 32	$ 9,555,042 15	$104,296,657 47

* Includes treasury certificates, $5,000 on hypothecation of unsold debentures.

† Includes guarantee, $100,000 Port Moody Steel Works

‡ Includes treasury certificates, $1,001,000.

IV.—SINKING FUNDS AS OF DECEMBER 31st, 1919.

The sinking fund investments as shown below are distributed as follows: Dominion of Canada bonds, $7,007,512.18; mortgages, $278,704.86; debentures of the municipalities, $4,558,523.21.

CITIES.

Municipality.	Cash.	Invested.	Total.	Sinking Fund Required.	Short.	Over.	Condition at End of Previous Year.	
							Short.	Over.
Alberni	$ 597 57	$ 21,084 10	$ 21,681 67	$ 20,952 02	.....	$ 729 65	$ 2,636 93	.....
Armstrong	6,218 47	30,142 85	36,361 32	43,708 82	$ 7,347 50	.....	18,593 61	.....
Chilliwack	4,783 80	16,370 60	21,154 40	31,439 57	10,285 17	.....	16,035 46	.....
Courtenay	460 98	1,000 00	1,460 98	1,960 22	499 24	.....	503 06	.....
Cranbrook	359 98	43,418 58	43,778 56	43,777 94	.....	62	.....	$ 33 47
Cumberland	.....	.....	.....	.....	.....	.....	7,159 48	.....
Duncan	108 54	27,300 00	27,408 54	37,290 70	9,882 16	.....	19,746 95	.....
Enderby	23	8,000 00	8,000 23	22,352 04	14,351 81	.....	14,667 80	.....
Fernie	16,579 34	103,216 00	119,795 34	117,111 50	.....	2,683 84	.....	4,937 81
Grand Forks	21,364 25	15,900 00	37,264 25	91,151 84	53,887 59	.....	67,205 19	.....
Greenwood	1,730 08	17,915 48	19,645 56	69,992 32	50,346 76	.....	43,418 00	.....
Kamloops	25,774 08	216,505 46	242,279 54	332,620 15	90,340 61	.....	109,416 10	.....
Kaslo	48 07	13,512 28	13,560 35	13,560 35	.....	.....	.....	.....
Kelowna	289 82	59,150 00	59,439 82	106,686 95	47,247 13	.....	54,251 26	.....
Ladysmith	2,007 15	25,000 00	27,007 15	31,849 07	4,841 92	.....	2,757 63	.....
Merritt	.....	23,254 54	23,254 54	27,713 19	4,458 65	.....	9,319 63	.....
Nanaimo	83,715 75	177,098 45	260,814 20	260,814 20	.....	.....	.....	.....
Nelson	9,114 21	292,510 47	301,624 68	348,923 99	47,299 31	.....	86,740 51	.....
New Westminster	42,771 60	539,592 58	582,364 18	768,239 33	185,875 15	.....	169,348 42	.....
North Vancouver	325,491 26	173,616 96	499,108 22	463,115 66	.....	35,992 56	105,426 18	.....
Phoenix	5,849 00	.....	5,849 00	5,849 00	.....	.....	.....	.....
Port Alberni	440 61	36,789 76	37,230 37	35,455 26	.....	1,775 11	.....	618 94
Port Coquitlam	5,427 03	20,867 76	26,294 79	67,524 95	41,230 16	.....	36,898 30	.....
Port Moody	25 87	26,100 00	26,125 87	26,125 87	.....	.....	7,467 78	.....
Prince George	1,498 20	30,766 20	32,264 40	43,966 50	11,702 10	.....	14,263 65	.....
Prince Rupert	.....	27,988 90	27,988 90	25,711 85	.....	2,277 05	.....	.....
Revelstoke	33,811 91	162,628 13	196,440 04	203,973 93	7,533 89	.....	34,098 13	.....
Rossland	15,697 83	69,075 57	84,773 40	84,773 40	.....	.....	.....	.....
Salmon Arm	596 84	13,800 00	14,396 84	20,401 08	6,004 24	.....	8,236 80	.....
Slocan	.....	.....	.....	.....	.....	.....	.....	.....
Trail	6,398 51	25,986 69	32,385 20	28,093 29	.....	4,291 91	.....	.....
Vancouver	282,035 71	6,217,252 69	6,498,288 40	8,238,152 82	1,738,864 42	.....	1,765,801 55	.....
Vernon	11,286 46	145,000 00	156,286 46	254,612 29	98,325 83	.....	136,589 40	.....
Victoria	912,539 59	1,254,575 36	2,167,114 95	4,610,439 10	2,443,324 15	.....	1,982,348 12	.....
Totals	$1,817,022 74	$ 9,835,419 41	$11,652,442 15	$16,478,339 20	$4,873,647 79	$ 47,750 74	$4,712,929 94	$ 5,590 22

DISTRICTS.

Municipality.	Cash.	Invested.	Total.	Sinking Fund Required.	Short.	Over.	Condition at End of Previous Year.	
							Short.	Over.
Burnaby	$ 82,348 31	$ 105,770 21	$ 188,118 52	$ 208,330 59	$ *20,212 07	.....	$ 25,340 95	.....
Chilliwhack	39 64	7,000 00	7,039 64	7,039 64	.....	.....	.....	.....
Coldstream	771 50	32,700 00	33,471 50	33,471 50	.....	.....	.....	.....
Coquitlam	475 57	34,976 00	35,451 57	35,189 22	.....	$ 262 35	.....	.....
Delta	12,601 73	43,000 00	55,601 73	49,571 14	.....	6,030 59	9,506 83	.....
Esquimalt	1,749 60	39,272 52	41,022 12	38,452 58	.....	2,569 54	.....	1,047 59
Fraser Mills	.....	.....	.....	.....	.....	.....	.....	.....
Kent	.....	.....	.....	.....	.....	.....	.....	.....
Langley	.....	.....	.....	.....	.....	.....	.....	.....
Maple Ridge	.....	.....	.....	.....	.....	.....	.....	.....
Matsqui	.....	.....	.....	.....	.....	.....	.....	.....
Mission	.....	.....	.....	.....	.....	.....	.....	.....
North Cowichan	76 34	2,450 00	2,526 34	2,337 26	.....	189 08	.....	.....
North Vancouver	1,141 29	125,759 79	126,901 08	126,901 08	.....	.....	375 00	.....
Oak Bay	14,315 73	360,655 16	374,970 89	343,312 08	.....	31,658 81	.....	$21,860 18
Peachland	370 90	7,200 00	7,570 90	11,171 44	3,600 54	.....	6,252 32	.....
Penticton	15,755 66	59,800 00	75,555 66	79,299 51	3,743 85	.....	31,510 41	.....
Pitt Meadows	.....	.....	.....	.....	.....	.....	.....	.....
Point Grey	21,881 95	465,990 18	487,872 13	412,292 94	.....	75,579 19	12,250 00	.....
Richmond	4,678 80	74,900 54	79,579 34	89,488 47	9,909 13	.....	22,238 30	.....
Saanich	783 01	257,434 84	258,217 85	243,244 13	.....	.....	.....	13,289 54
Salmon Arm	482 84	250 00	732 84	732 84	.....	.....	.....	3 54
South Vancouver	10,656 99	263,411 60	274,068 59	603,297 79	329,229 20	.....	334,719 66	.....
Spallumcheen	1,866 69	45,000 00	46,866 69	41,740 29	.....	5,126 40	2,236 21	.....
Sumas	.....	.....	.....	.....	.....	.....	.....	.....
Summerland	12,938 76	49,000 00	61,938 76	71,840 81	9,902 05	.....	12,892 83	.....
Surrey	.....	.....	.....	.....	.....	.....	.....	.....
West Vancouver	9,150 76	34,750 00	43,900 76	82,668 28	38,767 52	.....	35,840 69	.....
Totals	$ 192,086 07	$ 2,009,320 84	$ 2,201,406 91	$ 2,480,381 59	$ 415,364 36	$136,389 68	$ 493,163 20	$36,200 85
Cities forward	1,817,022 74	9,835,419 41	11,652,442 15	16,478,339 20	4,873,647 79	47,750 74	4,712,929 94	5,590 22
Cities and districts	$2,009,108 81	$11,844,740 25	$13,853,849 06	$18,958,720 79	$5,289,012 15	$184,140 42	$5,206,093 14	$41,791 07

* Represented by mortgages foreclosed.

V.—ARREARS OF TAXES.

The following is a comparative statement of outstanding arrears of taxes, 1914-19:—

CITIES.

Municipality.	1914.	1915.	1916.	1917.	1918.	1919.
Alberni	$ 17,060 08	$ 23,258 85	$ 32,431 80	$ 39,677 75	$ 53,737 50	$ 21,805 84
Armstrong	9,863 12	13,574 60	16,553 32	18,733 44	18,404 24	7,568 84
Chilliwack	24,239 91	43,131 68	27,572 73	27,634 87	23,131 73	13,463 33
Courtenay	.....	3,231 49	7,004 24	8,082 36	9,412 56	10,090 04
Cranbrook	28,245 71	46,951 89	50,021 36	35,437 21	31,523 31	28,265 30
Cumberland	3,331 55	11,024 76	14,745 12	13,629 39	12,654 25	1,970 79
Duncan	4,399 10	6,608 76	10,545 67	12,019 04	11,998 44	9,336 78
Enderby	11,210 80	9,372 40	9,323 02	7,341 76	8,628 97	8,863 68
Fernie	21,363 20	44,286 43	50,946 07	25,948 00	65,741 07	24,471 78
Grand Forks	26,925 59	37,462 47	51,039 03	41,652 41	47,877 33	25,660 15
Greenwood	12,702 50	16,938 65	21,251 00	27,361 85	30,773 92	35,538 92
Kamloops	49,177 30	84,288 62	123,533 10	117,701 81	119,385 81	86,025 85
Kaslo	7,248 80	8,100 04	8,698 63	9,471 74	4,132 05	4,123 69
Kelowna	54,627 34	56,350 47	64,048 70	45,524 16	38,217 89	32,173 33
Ladysmith	6,331 45	15,234 35	22,213 10	23,739 25	18,544 00	16,001 75
Merritt	29,038 76	37,007 34	42,701 86	48,284 22	20,640 54	21,008 53
Nanaimo	47,343 70	85,795 60	119,868 41	145,099 81	163,150 87	137,071 38
Nelson	64,590 44	73,140 81	78,240 05	77,262 72	87,402 22	33,464 82
New Westminster	237,801 07	384,731 67	481,065 77	428,354 46	360,432 80	294,815 98
North Vancouver	256,943 22	363,707 73	439,054 32	511,244 67	570,896 88	342,980 56
Phoenix	3,037 00	3,277 75	3,516 56	4,366 94	6,275 86	8,209 17
Port Alberni	21,319 94	28,048 65	35,069 42	41,776 59	51,109 32	12,942 06
Port Coquitlam	118,219 33	132,866 96	144,719 31	172,223 26	201,267 75	135,713 89
Port Moody	19,266 46	44,196 52	42,309 45	57,067 98	75,045 55	33,316 54
Prince George	.....	40,803 09	97,685 91	145,558 29	170,697 27	70,175 26
Prince Rupert	149,428 67	177,524 17	117,380 10	204,040 65	196,250 18	172,741 78
Revelstoke	43,576 99	74,123 61	75,710 54	50,930 98	43,512 83	41,813 62
Rossland	17,924 09	14,926 25	16,104 20	19,242 90	22,934 85	17,907 40
Salmon Arm	12,123 50	11,488 08	16,266 24	11,032 07	11,923 10	9,199 64
Sandon	18,286 65	439 67	640 58	504 42	216 23	.....
Slocan	4,052 31	5,283 51	6,392 56	7,290 39	5,449 02	5,936 24
Trail	3,283 41	3,018 81	4,727 00	4,690 32	10,168 01	8,068 65
Vancouver	1,863,985 08	3,137,423 73	4,219,211 33	5,043,110 92	5,456,453 11	5,216,455 66
Vernon	84,325 31	119,138 56	121,866 34	161,995 09	174,945 79	148,108 24
Victoria	708,503 55	1,688,983 31	2,332,377 85	3,057,619 84	3,428,632 54	2,960,911 20
Totals	$3,879,775 92	$6,845,741 28	$8,964,834 69	$10,642,651 56	$11,551,567 79	$9,996,200 69

DISTRICTS.

Municipality.	1914.	1915.	1916.	1917.	1918.	1919.
Burnaby	$ 404,669 10	$ 556,647 42	$ 593,132 46	$ 564,593 43	$ 496,024 79	$ 301,081 84
Chilliwhack	16,854 11	20,875 44	20,579 83	27,158 14	11,351 60	8,313 70
Coldstream	10,678 13	11,813 43	12,626 35	14,675 11	8,232 91	2,444 02
Coquitlam	47,744 19	37,783 19	44,886 05	54,644 32	88,735 33	69,155 66
Delta	18,722 26	15,929 80	24,223 91	16,182 46	15,857 18	12,959 75
Esquimalt	10,826 50	18,022 63	22,282 24	27,644 72	33,037 28	29,504 14
Fraser Mills	1 90	.....	.....	.....	.....	.....
Kent	5,182 30	8,363 92	8,889 00	7,773 90	7,143 64	2,645 08
Langley	33,707 76	35,306 33	35,397 42	41,212 17	27,044 18	19,858 51
Maple Ridge	21,610 26	23,995 22	23,593 17	24,203 75	23,678 66	6,968 42
Matsqui	25,365 61	31,380 08	21,957 50	19,532 50	19,140 54	11,928 24
Mission	11,497 55	20,546 50	30,080 20	37,022 22	23,471 35	15,564 10
North Cowichan	10,427 05	15,273 90	18,205 22	15,031 97	20,016 72	16,307 14
North Vancouver	195,410 22	217,653 53	212,410 91	252,532 30	202,866 97	221,337 34
Oak Bay	60,132 49	110,684 27	156,376 09	131,482 78	123,037 28	89,981 36
Peachland	5,224 27	7,124 31	5,414 39	5,343 08	4,006 39	5,300 29
Penticton	38,892 85	44,441 66	46,938 42	55,757 78	43,412 05	35,708 76
Pitt Meadows	933 86	4,921 19	8,957 81	10,604 30	10,325 57	1,115 29
Point Grey	305,536 30	332,473 28	405,797 85	357,493 58	417,869 92	346,042 11
Richmond	65,978 50	83,210 25	94,109 12	79,789 41	69,477 19	64,493 28
Saanich	82,069 69	88,345 58	111,132 28	134,813 06	105,184 36	100,303 88
Salmon Arm	10,624 49	9,057 69	7,871 00	9,665 90	10,521 85	9,012 72
South Vancouver	553,740 13	581,252 54	718,297 58	888,244 34	1,113,877 42	550,547 07
Spallumcheen	25,663 49	36,957 90	38,872 06	38,656 80	39,340 14	24,450 81
Sumas	3,590 80	6,007 30	7,269 58	5,390 53	3,637 82	1,459 00
Summerland	16,361 89	19,878 32	22,539 15	20,449 64	20,154 33	17,752 03
Surrey	61,159 53	77,167 28	73,295 28	58,098 41	46,292 24	39,856 55
West Vancouver	71,849 27	105,521 70	125,807 94	139,479 44	95,911 15	93,829 59
Totals	$2,114,454 50	$2,520,634 66	$ 2,890,942 81	$ 3,037,476 04	$ 3,079,648 86	$ 2,097,920 68
Cities forward	3,879,775 92	6,845,741 28	8,964,834 69	10,642,651 56	11,551,567 79	9,996,200 69
Cities and districts	$5,994,230 42	$9,366,375 94	$11,855,777 50	$13,680,127 60	$14,631,216 65	$12,094,121 37

VI.—RECEIPTS, 1919.

The figures submitted under the headings of "Receipts" and "Expenditures" are prepared very largely from an analysis of the auditors' reports, and although the classification of expenditures is not uniform in the different municipalities, and it is in many cases extremely difficult to make a distribution of the items, yet the statements have been prepared with a good deal of care and may be taken to be substantially correct. Items which are of the nature of cross-entries, deposit accounts, and trust accounts, which would have the effect of inflating the figures, have as far as possible been eliminated.

Cities.

Municipality.	Land-taxes received.	Trade Licences.	Road-taxes.	Dog-taxes.	Fines.	Government Grant for Schools.	Receipts from Public Utilities.	Sundry Receipts.	Total.
Alberni	$ 23,163 82	$ 157 00	$ 13 00	$ 33 00	.....	$ 847 50	$ 4,197 41	$ 1,984 80	$ 30,396 53
Armstrong	34,833 54	1,171 70	151 40	48 00	$ 89 00	6,215 00	18,091 57	4,894 30	65,494 51
Chilliwack	41,337 24	1,562 50	270 00	314 50	1,597 60	6,543 35	.....	11,978 32	63,603 51
Courtenay	11,476 74	632 50	66 00	82 00	55 00	1,412 50	6,367 39	1,205 35	21,297 48
Cranbrook	61,751 44	2,085 50	212 00	132 90	2,575 00	8,060 00	19,442 79	4,543 37	98,803 00
Cumberland	12,451 09	1,470 00	260 00	40 00	471 50	10,807 30	.....	6,441 13	31,941 02
Duncan	31,098 35	1,717 50	158 00	132 00	122 00	2,335 00	14,848 29	4,420 02	54,831 16
Enderby	20,222 31	450 00	198 00	44 00	42 10	2,118 75	2,821 46	1,069 35	26,965 97
Fernie	114,936 21	3,592 50	840 00	520 50	3,334 00	12,904 40	50,718 30	128 14	186,974 05
Grand Forks	37,740 91	1,360 00	128 00	53 50	145 10	6,360 30	21,984 11	1,017 55	68,789 47
Greenwood	8,633 07	510 00	.....	2 00	12 50	1,695 00	2,380 00	1,707 75	14,940 32
Kamloops	180,472 45	3,694 00	768 00	475 00	5,185 45	8,753 30	171,145 60	11,930 35	382,424 15
Kaslo	14,574 21	462 50	20 00	101 00	20 00	4,290 00	12,885 91	1,461 72	33,815 34
Kelowna	89,242 94	2,386 50	506 00	284 00	373 50	5,910 00	42,103 34	8,778 88	149,585 16
Ladysmith	30,750 00	1,255 00	304 00	23 00	427 50	5,243 35	12,035 72	7,989 74	58,028 31
Merritt	27,155 40	1,937 50	120 00	262 50	1,950 00	4,020 00	17,171 03	329 06	52,945 49
Nanaimo	174,510 92	5,348 00	2,232 00	405 00	5,488 75	16,800 00	36,377 10	11,028 30	252,190 07
Nelson	145,266 11	3,251 00	1,050 00	247 00	2,235 65	13,859 43	121,900 84	25,821 24	313,631 27
New Westminster	523,542 11	7,950 50	1,466 60	555 00	8,271 95	35,918 00	174,834 85	61,519 55	814,058 56
North Vancouver	375,804 36	3,006 00	.....	830 25	1,582 00	19,694 81	213,244 50	48,396 97	662,558 89
Phoenix	4,522 30	435 00	.....	34 00	52 50	2,260 00	.....	4,852 49	12,156 29
Port Alberni	46,538 74	692 00	454 00	106 00	164 00	1,920 70	15,524 42	961 53	66,361 39
Port Coquitlam	54,558 12	397 50	642 00	158 00	128 00	3,420 00	3,845 36	2,132 85	65,281 83
Port Moody	52,532 65	410 00	924 00	106 00	21 50	2,887 18	4,756 29	4,775 11	66,412 73
Prince George	32,658 82	2,127 00	142 00	62 00	4,560 80	3,390 00	17,735 07	35,492 34	96,168 03
Prince Rupert	264,248 70	7,405 00	1,329 00	419 00	8,668 50	10,356 65	127,693 53	4,147 50	424,267 88
Revelstoke	108,201 94	1,332 50	520 75	248 72	794 00	9,883 14	49,517 57	5,006 18	175,504 80
Rossland	38,272 37	1,786 50	279 80	98 32	674 00	7,800 00	9,937 06	21,312 60	80,160 65
Salmon Arm	23,550 33	780 00	18 00	41 00	341 85	3,094 15	8,836 89	2,168 33	38,830 55
Slocan	3,217 04	62 50	.....	.....	.....	1,130 06	354 00	1,090 08	5,853 62
Trail	50,959 35	2,225 50	1,170 00	286 00	2,235 00	10,026 27	15,092 77	6,752 20	88,747 09
Vancouver	5,438,944 41	196,126 34	.....	2,845 75	130,092 93	225,215 00	470,562 77	165,586 74	6,629,373 94
Vernon	163,135 97	3,280 30	724 00	350 00	3,317 50	10,616 65	62,328 45	4,093 39	247,846 26
Victoria	1,982,844 77	44,195 50	7,570 00	3,783 50	14,290 16	81,841 60	218,262 93	85,217 32	2,438,005 78
Totals	$10,223,148 73	$305,255 84	$22,536 55	$13,123 44	$199,319 34	$547,629 33	$1,946,997 32	$560,234 55	$13,818,245 10

DISTRICTS.

Municipality.	Land-taxes received.	Trade Licences.	Road-taxes.	Dog-taxes.	Fines.	Government Grant for Schools.	Receipts from Public Utilities.	Sundry Receipts.	Total.
Burnaby	$ 471,621 92	$ 932 50	$ 470 50	$ 987 00	$ 3,119 40	$ 27,481 70	$ 30,889 73	$ 70,115 02	$ 605,617 77
Chilliwhack	70,905 68	490 00	675 00	.....	297 45	16,042 00	.....	4,719 79	93,129 92
Coldstream	29,080 89	.....	.....	.....	26 00	1,044 00	1,864 37	1,438 40	33,453 66
Coquitlam	39,979 87	272 00	632 00	24 75	191 00	4,002 00	493 95	5,556 42	51,151 99
Delta	91,901 51	605 00	1,026 00	174 00	1,979 45	10,150 00	8,035 38	4,720 19	118,591 53
Esquimalt	110,587 17	1,033 50	474 00	540 00	617 00	11,651 00	.....	2,943 06	127,845 73
Fraser Mills	4,165 71	69 00	.....	15 00	10 00	.....	.....	41 50	4,301 21
Kent	12,738 52	330 00	.....	.....	5 00	4,060 00	.....	2,848 60	19,982 12
Langley	52,396 76	415 00	1,199 00	.....	425 50	12,249 15	.....	6,521 80	73,207 21
Maple Ridge	51,039 52	315 00	1,229 10	.....	40 35	9,325 68	.....	4,130 86	66,080 51
Matsqui	41,580 81	210 00	.....	.....	35 00	9,222 00	.....	1,902 71	52,950 52
Mission	36,762 32	32 50	606 00	.....	342 50	10,185 70	.....	10,140 10	58,069 12
North Cowichan	27,676 94	497 50	1,567 45	375 00	174 00	2,088 00	.....	117 00	32,495 89
North Vancouver	158,385 82	400 00	893 90	379 50	1,061 55	7,656 00	8,478 25	19,770 92	197,025 94
Oak Bay	229,114 15	539 50	170 00	634 00	361 00	10,558 00	20,222 75	17,793 98	279,393 38
Peachland	9,591 75	250 00	.....	33 00	111 00	2,626 80	3,526 65	205 10	16,344 30
Penticton	85,648 45	2,869 75	374 00	214 00	505 00	8,670 14	46,393 59	15,314 04	159,988 97
Pitt Meadows	20,042 74	20 00	146 00	.....	.....	1,208 35	.....	923 42	22,340 51
Point Grey	636,461 09	205 00	625 30	647 00	3,179 25	26,390 00	33,226 69	48,731 66	749,465 99
Richmond	119,697 33	2,214 25	2,196 00	.....	2,823 03	11,013 50	23,489 90	19,189 64	180,623 65
Saanich	223,315 39	165 00	1,342 00	699 00	1,800 00	37,261 50	24,440 21	22,746 70	311,769 80
Salmon Arm	20,489 96	25 00	2 00	.....	.....	3,770 00	.....	4,204 13	28,491 09
South Vancouver	1,006,206 91	2,675 00	3,103 50	1,480 00	4,673 50	93,057 94	81,227 36	100,671 96	1,293,096 17
Spallumcheen	46,315 64	65 00	75 20	.....	.....	4,660 45	12 00	114 67	51,242 96
Sumas	11,924 67	.....	44 00	.....	51 65	3,209 75	.....	132 50	15,362 57
Summerland	46,875 88	337 50	.....	142 80	.....	7,270 74	29,221 07	7,775 43	91,623 42
Surrey	72,782 20	340 00	1,681 20	238 52	377 00	12,934 00	.....	11,150 29	99,503 21
West Vancouver	105,292 77	225 00	.....	110 00	2 50	3,480 00	51,717 81	3,469 77	164,297 85
Totals	$ 3,832,582 37	$ 15,533 00	$18,532 15	$ 6,693 57	$ 22,208 13	$351,268 40	$ 363,239 71	$387,389 66	$ 4,997,446 99
Cities forward	10,223,148 73	305,255 84	22,536 55	13,123 44	199,319 34	547,629 33	1,946,997 32	560,234 55	13,818,245 10
Cities and districts..	$14,055,731 10	$320,788 84	$41,068 70	$19,817 01	$221,527 47	$898,897 73	$2,310,237 03	$947,624 21	$18,815,692 09

n y	Donations and Grants.	Council Salaries.	Salaries and Office Expenses.	Public Utilities, including Interest and Sinking Fund.	Sundry Expenditures.	Total.
63	$ 300 00	.....	$ 2,213 48	$ 9,118 10	$ 5,617 86	$ 26,004 01
57	680 00	$ 190 00	2,104 01	22,772 95	3,766 81	54,197 23
12	890 40	732 00	3,449 57	.....	357 55	60,032 34
00	266 60	.....	1,712 08	5,554 13	1,982 87	20,280 56
15	1,699 80	.....	3,977 84	19,672 74	4,610 17	102,084 47
41	.....	172 00	2,978 37	.....	5,312 81	28,249 80
07	552 50	337 50	2,191 25	15,476 93	2,436 84	43,061 84
90	349 68	.....	2,372 93	3,192 84	2,166 94	26,432 06
13	945 00	1,195 00	3,267 57	38,822 01	5,231 41	140,567 10
57	247 35	809 00	3,499 16	20,717 97	7,688 41	63,316 72
03	.....	.....	1,989 81	3,544 17	122 45	18,392 31
04	6,333 30	500 00	6,839 37	197,769 80	55,234 79	375,655 55
65	442 40	.....	2,056 18	10,582 38	1,667 66	33,127 20
35	2,756 39	975 00	5,776 52	48,356 77	5,838 86	135,785 06
50	175 00	685 40	6,347 10	13,098 37	8,882 04	58,312 14
85	279 60	.....	2,022 95	18,888 38	3,207 97	46,569 49
89	562 50	2,375 00	8,000 65	35,288 10	19,272 55	209,463 72
63	1,096 50	1,200 00	10,530 51	104,848 35	36,863 24	269,345 15
79	20,074 85	4,800 00	29,642 52	125,814 93	46,314 13	819,416 22
13	3,497 58	3,000 00	18,703 85	214,598 94	10,360 63	584,921 98
..	.....	.....	1,313 40	.....	1,545 20	12,179 86
38	364 50	1,016 00	3,321 78	25,269 12	4,104 29	55,563 28
00	507 55	2,132 00	8,218 57	10,479 64	2,912 41	72,915 82
41	.....	500 00	4,958 91	7,491 25	4,058 80	53,986 34
78	890 00	2,652 50	12,494 18	36,423 72	5,536 54	96,533 68
30	9,474 74	3,900 00	27,462 67	116,951 01	27,973 46	387,374 50
18	1,267 50	500 00	4,151 74	54,618 85	1,405 81	136,486 74
48	207 52	948 00	3,712 29	8,984 43	5,266 77	77,696 98
46	979 40	.....	4,404 91	14,769 17	457 38	34,562 70
..	200 00	.....	671 23	315 20	217 72	4,718 73
71	135 50	1,125 00	6,242 70	15,655 83	4,239 07	86,686 09
04	220,876 30	14,600 00	164,495 06	414,557 94	402,114 61	6,067,595 84
98	3,754 19	1,000 00	4,787 71	70,145 99	9,362 44	195,718 29
96	15,494 06	7,000 00	78,056 99	262,184 30	214,518 11	2,807,659 87
09	$295,300 71	$ 52,344 40	$443,967 86	$1,945,964 31	$ 910,648 60	$13,204,893 67

65	$ 1,270 60	$ 2,685 00	$ 27,154 49	$ 73,423 58	$ 42,151 44	$ 499,454 57
58	1,791 23	1,000 00	1,826 18	.....	23,801 89	86,542 63
65	225 00	.....	2,605 45	13,079 73	589 93	26,228 24
45	100 00	1,382 00	3,368 55	1,571 65	3,764 11	32,669 53
44	574 42	1,310 00	3,612 96	21,331 70	17,351 83	114,733 00
12	668 83	1,500 00	7,035 31	.....	5,309 12	114,953 94

VII.—EXPENDITURES, 1919.

Cities.

Municipality.	Interest on Debentures exclusive of Schools and Public Utilities.	Sinking Fund for Debentures exclusive of Schools and Public Utilities.	Roads and Streets.	Street-lighting.	Parks.	Sewers.	Fire Protection.	Public Health.	Administration of Justice.	Schools.	Interest on Temporary Loans.	Donations and Grants.	Council, Salaries.	Salaries and Office Expenses.	Public Utilities, including Interest and Sinking Fund.	Sundry Expenditures.	Total.
Alberni	$ 480 00	297 75	$ 1,653 07	$ 228 00	$ 775 62	.....	$ 1,573 35	$ 20 00	$ 20 00	$ 3,540 15	$ 166 33	$ 300 00	.....	$ 2,213 48	$ 9,118 10	$ 5,617 86	$ 26,004 01
Armstrong	1,108 24	$ 956 09	1,043 96	2,000 00	34 90	.....	.....	172 55	1,352 55	17,746 60	268 57	680 00	$ 190 00	2,104 01	22,772 95	3,766 81	54,197 23
Chilliwack	9,970 78	4,549 60	3,385 22	1,949 20	.....	$ 1,921 32	2,704 86	544 20	2,224 10	26,842 42	511 12	890 40	732 00	3,449 57	.....	357 55	60,032 34
Courtenay	.....	.....	2,902 94	623 52	.....	.....	24 75	412 10	1,540 80	5,049 77	211 90	266 60	.....	1,712 08	5,554 13	1,982 87	20,280 56
Cranbrook	8,416 87	3,346 10	9,113 49	2,284 08	.....	610 00	9,182 20	1,445 44	4,968 27	31,660 32	1,097 15	1,699 80	.....	3,977 84	19,672 74	4,610 17	102,084 47
Cumberland	.....	.....	2,315 55	764 50	.....	67 25	574 79	.....	1,201 50	14,727 62	135 41	.....	172 00	2,978 37	.....	5,312 81	28,249 80
Duncan	1,556 00	1,790 31	2,262 77	1,900 00	.....	.....	139 88	50 00	322 37	13,420 42	625 97	552 50	337 50	2,191 25	15,476 93	2,436 84	43,061 84
Enderby	2,399 92	1,343 29	1,486 96	639 26	.....	.....	.....	214 38	728 04	11,255 92	287 90	349 68	.....	2,372 93	3,192 84	2,166 94	26,432 06
Fernie	8,229 90	5,259 81	4,328 24	3,975 62	329 17	866 27	6,352 72	2,456 66	8,584 79	47,566 80	3,156 13	945 00	1,195 00	3,267 57	38,822 01	5,231 41	140,567 10
Grand Forks	3,115 00	2,885 18	1,541 29	.....	515 00	.....	978 31	311 08	1,842 73	19,063 67	102 57	247 35	809 00	3,499 16	20,717 97	7,688 41	63,316 72
Greenwood	3,024 00	1,924 65	426 17	577 50	.....	.....	17 82	.....	311 37	6,298 34	156 93	.....	.....	1,989 81	3,544 17	122 45	18,392 31
Kamloops	14,253 68	12,799 31	21,142 39	.....	3,667 14	452 66	12,117 59	636 70	8,964 82	34,380 96	563 04	6,333 30	500 00	6,839 37	197,769 80	55,234 79	375,655 55
Kaslo	360 23	523 40	4,020 27	1,200 00	.....	.....	735 30	103 02	387 40	11,044 31	4 35	442 40	.....	2,056 18	10,582 38	1,667 66	33,127 20
Kelowna	11,424 78	6,665 00	7,102 60	1,770 94	3,343 78	2,583 98	3,033 04	68 40	3,534 78	31,401 87	1,152 35	2,756 39	975 00	5,776 52	48,356 77	5,838 86	135,785 06
Ladysmith	4,288 55	2,262 85	1,172 96	1,775 00	.....	71 65	73 55	.....	176 25	18,984 92	318 50	175 00	685 40	6,347 10	13,098 37	8,882 04	58,312 14
Merritt	1,500 00	1,616 63	1,099 64	5,500 00	.....	.....	102 25	112 50	1,885 05	10,043 67	310 85	279 60	.....	2,022 95	18,888 38	3,207 97	46,569 49
Nanaimo	32,788 16	20,619 36	12,505 12	7,990 80	409 06	983 92	6,494 95	1,593 17	7,607 56	50,863 93	2,108 89	562 50	2,375 00	8,000 65	35,288 10	19,272 55	209,463 72
Nelson	7,581 79	6,692 93	16,323 51	7,000 00	411 49	19 00	11,551 48	6,810 70	5,726 91	52,416 11	272 63	1,096 50	1,200 00	10,530 51	104,848 35	36,863 24	269,345 15
New Westminster	206,510 73	65,574 79	74,893 16	3,539 37	7,300 08	.....	43,499 17	6,620 94	25,390 83	148,557 93	10,882 79	20,074 85	4,800 00	29,642 52	125,814 93	46,314 13	819,416 22
North Vancouver	81,593 84	42,286 04	38,733 02	6,316 13	5,395 83	171 94	13,339 84	26,772 22	12,119 21	88,145 78	19,887 13	3,497 58	3,000 00	18,703 85	214,598 94	10,360 63	584,921 98
Phoenix	360 00	223 30	631 74	.....	.....	.....	96 00	.....	1,671 28	6,338 94	.....	.....	.....	1,313 40	.....	1,545 20	12,179 86
Port Alberni	1,473 10	1,742 63	3,823 22	2,800 00	.....	.....	1,334 44	1,635 27	1,924 46	6,437 09	317 38	364 50	1,016 00	3,321 78	25,269 12	4,104 29	55,563 28
Port Coquitlam	15,990 00	6,861 78	3,821 51	1,443 75	.....	.....	577 19	1,226 95	1,283 64	12,090 83	5,370 00	507 55	2,132 00	8,218 57	10,479 64	2,912 41	72,915 82
Port Moody	5,598 00	4,152 80	11,727 85	940 50	.....	.....	314 90	328 00	2,016 72	9,476 20	2,422 41	.....	500 00	4,958 91	7,491 25	4,058 80	53,986 34
Prince George	2,940 00	4,223 63	400 80	1,500 00	.....	.....	4,901 65	234 90	5,553 95	15,909 03	2,872 78	890 00	2,652 50	12,494 18	36,423 72	5,536 54	96,533 68
Prince Rupert	58,318 38	21,307 35	26,689 92	6,778 20	.....	4,151 88	15,006 23	4,372 40	15,823 72	48,617 24	547 30	9,474 74	3,900 00	27,462 67	116,951 01	27,973 46	387,374 50
Revelstoke	17,022 66	9,592 05	4,515 13	477 78	14 97	540 04	1,959 17	134 00	5,285 40	32,838 46	2,163 18	1,267 50	500 00	4,151 74	54,618 85	1,405 81	136,486 74
Rossland	5,370 00	5,962 02	6,952 23	2,060 26	.....	.....	5,809 92	1,992 93	2,962 36	27,377 77	90 48	207 52	948 00	3,712 29	8,984 43	5,266 77	77,696 98
Salmon Arm	510 00	741 47	2,734 72	1,831 20	.....	.....	5 80	61 00	312 50	7,523 69	231 46	979 40	.....	4,404 91	14,769 17	457 38	34,562 70
Slocan	.....	600 00	348 97	.....	.....	.....	.....	.....	.....	2,365 61	.....	200 00	.....	671 23	315 20	217 72	4,718 73
Trail	5,284 20	3,637 77	6,218 75	700 05	175 92	1,030 10	1,985 07	2,589 36	3,925 54	32,216 52	1,524 71	135 50	1,125 00	6,242 70	15,655 83	4,239 07	86,686 09
Vancouver	1,115,623 55	763,890 27	463,186 38	84,147 62	66,950 59	103,898 02	339,114 67	62,665 88	408,560 39	1,238,245 52	204,669 04	220,876 30	14,600 00	164,495 06	414,557 94	402,114 61	6,067,595 84
Vernon	20,277 26	13,381 80	6,519 54	7,500 00	520 14	2,078 34	4,591 55	2,883 74	4,831 87	42,475 74	1,607 98	3,754 19	1,000 00	4,787 71	70,145 99	9,362 44	195,718 29
Victoria	571,571 36	648,263 43	153,155 28	45,392 56	24,809 95	26,772 95	138,577 08	43,022 76	95,105 30	437,716 78	46,018 96	15,494 06	7,000 00	78,056 99	262,184 30	214,518 11	2,807,659 87
Totals	$2,218,940 98	$1,665,973 39	$ 898,178 37	$205,605 84	$114,653 64	$146,219 32	$626,769 52	$169,491 25	$638,146 46	$2,562,640 93	$310,048 09	$295,300 71	$ 52,344 40	$443,967 86	$1,945,964 31	$ 910,648 60	$13,204,893 67

Districts.

Burnaby	$ 66,521 00	$ 29,054 00	$ 87,669 08	$ 8,062 60	.....	$ 21,779 28	.....	$ 745 67	$ 14,235 96	$ 107,700 22	$ 17,001 65	$ 1,270 60	$ 2,685 00	$ 27,154 49	$ 73,423 58	$ 42,151 44	$ 499,454 57
Chilliwack	.....	.....	14,842 17	.....	.....	.....	$ 70 00	.....	1,869 79	40,354 79	986 58	1,791 23	1,000 00	1,826 18	.....	23,801 89	86,542 63
Coldstream	848 50	1,307 66	4,023 90	.....	.....	.....	.....	.....	488 70	2,839 72	219 65	225 00	.....	2,605 45	13,079 73	589 93	26,228 24
Coquitlam	4,200 00	1,487 63	6,435 40	440 83	.....	.....	350 50	75 00	1,205 08	7,996 33	292 45	100 00	1,382 00	3,368 55	1,571 65	3,764 11	32,669 53
Delta	6,851 88	6,647 10	28,336 05	.....	.....	.....	.....	2,809 34	1,592 85	22,650 43	1,664 44	574 42	1,310 00	3,612 96	21,331 70	17,351 83	114,733 00
Esquimalt	20,000 00	3,546 20	26,986 73	2,727 04	.....	3,656 54	1,497 92	850 79	4,290 98	35,612 36	1,272 12	668 83	1,500 00	7,035 31	.....	5,309 12	114,953 94
Fraser Mills	.....	.....	2,034 41	240 00	.....	100 00	100 00	.....	1,115 50	333 98	.....	.....	.....	531 37	.....	.....	4,455 26
Kent	.....	.....	5,264 38	.....	.....	.....	.....	146 75	56 15	8,979 93	83 10	927 75	305 00	995 70	.....	3,429 36	20,188 12
Langley	.....	.....	23,402 66	.....	.....	.....	.....	381 60	934 85	27,888 78	1,231 36	1,239 85	1,700 00	5,599 66	.....	4,549 90	66,928 66
Maple Ridge	.....	.....	21,364 98	377 25	.....	.....	.....	1,681 93	1,179 05	23,076 78	133 90	2,267 00	1,530 50	4,093 72	.....	5,696 08	61,401 19
Matsqui	.....	.....	22,851 45	.....	.....	.....	.....	.....	388 71	22,674 77	453 89	614 00	1,500 00	2,080 90	.....	3,949 34	54,513 06
Mission	.....	.....	17,592 31	159 70	.....	.....	.....	.....	236 00	23,586 30	259 57	300 00	850 00	2,697 75	.....	3,960 92	49,642 55
North Cowichan	1,750 00	1,375 00	16,037 90	.....	.....	.....	.....	6 00	1,551 26	7,905 25	.....	1,120 00	753 85	3,537 43	.....	1,194 00	35,230 69
North Vancouver	46,193 52	12,931 20	59,549 16	2,928 90	$ 690 40	.....	967 34	1,445 89	7,077 94	35,241 56	1,215 13	2,065 00	2,550 00	19,091 52	20,372 99	2,572 32	214,892 87
Oak Bay	53,914 31	42,751 53	14,609 15	1,300 14	1,063 00	3,433 19	5,326 00	797 80	6,039 91	46,357 63	4,246 87	1,705 00	.....	13,209 96	23,913 98	29,215 92	247,884 39
Peachland	472 00	292 14	1,361 75	1,270 00	16 00	.....	.....	118 50	101 65	6,499 26	587 03	.....	.....	1,128 90	4,726 62	296 58	16,870 43
Penticton	5,185 00	3,483 09	8,525 66	5,000 00	282 73	.....	3,336 82	189 65	3,680 41	26,849 70	2,897 48	740 34	1,450 00	4,920 86	53,032 69	8,250 19	127,824 62
Pitt Meadows	.....	.....	3,156 64	.....	.....	.....	.....	50 00	120 00	2,871 90	.....	.....	384 00	1,804 42	.....	7,895 33	16,282 29
Point Grey	195,039 27	33,832 56	60,368 94	14,456 30	7,130 27	13,218 01	22,900 57	6,870 68	20,833 39	155,430 88	13,138 67	6,723 23	3,100 00	45,827 71	91,320 95	33,505 81	723,697 24
Richmond	16,912 29	3,872 37	40,053 98	.....	.....	.....	24 60	692 54	6,066 31	31,878 28	1,071 52	1,114 14	2,500 00	4,650 70	26,472 80	52,504 41	187,813 94
Saanich	27,587 15	27,823 60	65,871 24	714 97	4,106 18	.....	3,080 24	6,035 82	5,238 25	101,539 42	2,613 05	1,485 00	1,000 00	17,669 25	47,056 13	18,807 23	330,627 53
Salmon Arm	150 00	363 07	9,857 64	.....	.....	.....	.....	.....	44 85	8,730 78	99 05	400 00	876 35	1,495 73	.....	5,298 64	27,316 11
South Vancouver	221,086 68	61,201 00	66,627 25	19,551 36	872 49	24,633 72	17,980 24	3,367 47	20,844 54	312,227 86	45,760 72	11,193 83	.....	51,272 52	118,022 42	66,531 65	1,041,173 76
Spallumcheen	2,202 75	940 44	7,257 03	.....	.....	.....	.....	120 00	.....	15,536 34	142 85	1,900 00	400 00	3,335 07	4,696 83	2,603 51	39,134 82
Sumas	.....	.....	7,631 12	.....	.....	.....	.....	100 00	27 95	6,598 36	39 00	100 00	800 00	872 80	.....	599 11	16,768 34
Summerland	1,250 00	839 52	6,251 93	503 60	.....	.....	.....	55 00	422 25	21,622 42	1,076 45	879 56	550 00	992 56	42,955 62	10,458 39	87,857 30
Surrey	.....	.....	45,711 20	359 15	.....	.....	.....	504 20	3,703 92	38,085 08	1,619 62	1,300 76	2,250 00	10,859 60	.....	11,220 70	115,614 23
West Vancouver	21,352 24	4,664 39	11,436 26	9 90	.....	.....	.....	.....	1,687 34	12,916 45	1,595 76	409 78	2,000 00	6,334 18	65,075 25	2,948 31	129,641 39
Totals	$ 691,516 59	$ 236,412 50	$ 685,110 37	$ 58,101 74	$ 14,161 07	$ 66 820 74	$ 55,634 23	$ 27,044 63	$105,033 59	$1,153,985 56	$ 99,701 91	$ 41,115 32	$32,376 70	$248,605 26	$ 607,052 94	$ 368,456 02	$ 4,491,129 17
Cities forward	2,218,940 98	1,665,973 39	898,178 37	205,605 84	114,653 64	146,219 32	626,769 52	169,491 25	638,146 46	2,562,640 93	310,048 09	295,300 71	52,344 40	443,967 86	1,945,964 31	910,648 60	13,204,893 67
Cities and districts	$2,910,457 57	$1,902,385 89	$1,583,288 74	$263,707 58	$128,814 71	$213,040 06	$682,403 75	$196,535 88	$743,180 05	$3,716,626 49	$409,750 00	$336,416 03	$84,721 10	$692,573 12	$2,553,017 25	$1,279,104 62	$17,696,022 84

VIII.—TAXES LEVIED, 1919.

Cities.		Districts.	
Alberni	$ 26,098 23	Burnaby	$ 342,711 77
Armstrong	19,936 65	Chilliwhack	60,434 37
Chilliwack	43 828 90	Coldstream	21,578 35
Courtenay	8,313 12	Coquitlam	31,537 18
Cranbrook	55,228 20	Delta	73,034 68
Cumberland	6,710 20	Esquimalt	101,169 02
Duncan	26 476 71	Fraser Mills	4,165 71
Enderby	19 111 69	Kent	8,239 96
Fernie	65 238 70	Langley	45,915 00
Grand Forks	30,002 15	Maple Ridge	31,988 11
Greenwood	4,909 18	Matsqui	31,280 00
Kamloops	148,094 04	Mission	39,373 49
Kaslo	12,158 19	North Cowichan	19,769 51
Kelowna	78,138 36	North Vancouver	163,158 58
Ladysmith	28,206 55	Oak Bay	173,314 80
Merritt	23,252 17	Peachland	8,452 88
Nanaimo	138,178 15	Penticton	72,930 77
Nelson	87,284 71	Pitt Meadows	8,077 94
New Westminster	407,832 00	Point Grey	562,251 57
North Vancouver	340,164 38	Richmond	111,089 01
Phoenix	6,455 61	Saanich	197,149 34
Port Alberni	38,851 09	Salmon Arm	18,731 68
Port Coquitlam	61,914 86	South Vancouver	771,850 00
Port Moody	40,623 17	Spallumcheen	27,543 35
Prince George	55,974 67	Sumas	9,458 08
Prince Rupert	234,882 86	Summerland	42,404 55
Revelstoke	78,184 09	Surrey	69,093 60
Rossland	32,096 27	West Vancouver	96,151 90
Salmon Arm	19,770 69		
Slocan	2,768 66	Total	$ 3,142,855 20
Trail	48,040 62	Cities forward	9,098,719 91
Vancouver	4,911,069 85		
Vernon	114,674 05	Cities and districts	$12,241,575 11
Victoria	1,884,251 14		
Total	$ 9,098,719 91		

IX.—COMPARATIVE STATEMENT OF MONEYS COLLECTED FROM PRINCIPAL SOURCES OF REVENUE, 1914-19.

	1914.	1915.	1916.	1917.	1918.	1919.
Taxes	$8,698,819 73	$8,639,020 63	$8,461,513 83	$9,340,932 90	$10,593,177 86	$14,055,731 10
Trade licences	163,919 85	158,510 20	145,939 90	158,731 75	153,450 30	320,788 84
Liquor licences	221,300 00	214,051 00	288,070 00	153,204 33	.....	.....
Government grant to schools	760,000 99	790,001 16	748,848 07	824,259 72	892,109 73	898,897 73
Fines and costs	130,568 40	95,497 51	83,885 73	104,150 51	160,885 74	221,527 47

X.—COMPARATIVE STATEMENT OF EXPENDITURES ON STREETS, FIRE, ADMINISTRATION OF JUSTICE, PUBLIC HEALTH, AND COUNCIL SALARIES, 1914-19.

	1914.	1915.	1916.	1917.	1918.	1919.
Streets	$5,323,970 48	$2,444,368 70	$1,445,660 72	$1,350,198 45	$1,266,277 09	$1,583,288 74
Fire	769,772 90	604,149 62	569,745 77	545,744 64	587,191 46	682,403 75
Administration of justice	803,361 73	681,660 19	570,943 46	562,158 66	600,507 81	743,180 05
Public health	246,977 52	207,494 80	170,850 73	166,343 50	200,612 70	196,535 88
Council salaries	92,556 38	82,616 96	77,353 91	80,869 04	80,940 06	84,721 10
Schools	2,693,645 19	2,661,051 65	2,680,265 77	2,902,801 83	3,154,418 13	3,716,626 49

It will be recognized that it is impossible with the limited information at hand to make an exhaustive report of the actual profit and loss of the municipal utilities, but the statements submitted will show the extent of the demands upon the other revenues of the municipalities by the public utilities, or, as the case may be, the extent to which the other revenues of the municipalities are supplemented by those from the public utilities.

ELECTRIC LIGHT—CITIES.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Alberni	$ 9,596 69	$ 1,794 25	$ 972 17	$ 2,766 42	$ 1,665 46	.....	$ 1,100 96
Armstrong	76,629 09	11,091 71	5,751 96	16,843 67	12,203 55	.....	4,640 12
Courtenay	21,754 41	3,609 81	1,944 32	5,554 13	6,367 39	$ 813 26	.....
Duncan	65,000 00	6,573 08	5,460 78	12,033 86	10,628 01	.....	1,405 85
Fernie	64,149 32	21,208 58	5,231 57	26,440 15	31,572 89	5,132 74	.....
Grand Forks	21,000 00	7,411 16	1,431 85	8,843 01	12,887 98	4,044 97	.....
Kamloops	203,351 75	79,402 59	18,781 47	98,184 06	96,576 15	.....	1,607 91
Kaslo	27,753 98	5,252 56	2,574 84	7,827 40	9,143 98	1,316 58	.....
Ladysmith	26,545 40	11,162 67	1,935 70	13,098 37	12,035 72	.....	1,062 65
Nelson	335,554 74	32,998 88	25,844 65	58,843 53	61,886 51	3,042 98	.....
New Westminster	203,349 64	36,384 24	11,876 28	48,260 52	84,331 48	36,070 96	.....
Port Alberni	48,419 36	6,803 50	4,398 28	11,201 78	9,464 51	.....	1,737 27
Prince George	76,361 61	11,787 61	7,372 34	19,159 95	11,620 32	.....	7,539 63
Salmon Arm	36,283 22	4,099 48	3,402 72	7,502 20	5,517 76	.....	1,984 44
Vernon	147,610 31	28,352 10	16,862 95	45,215 05	44,261 52	.....	953 53
Totals	$ 1,363,359 52	$267,932 22	$ 113,841 88	$ 381,774 10	$ 410,163 23	$ 50,421 49	$ 22,032 36

ELECTRIC LIGHT—DISTRICTS.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Peachland	$ 14,614 20	$ 2,371 55	$ 1,328 77	$ 3,700 32	$ 2,780 40	.....	$ 919 92
Penticton	101,044 61	13,680 13	7,090 91	20,771 04	18,657 50	.....	2,113 54
Summerland	.....	3,593 40	2,014 19	5,607 59	4,681 08	.....	926 51
Totals	$ 115,658 81	$ 19,645 08	$ 10,433 87	$ 30,078 95	$ 26,118 98	.....	$ 3,959 97
Cities forward	1,363,359 52	267,932 22	113,841 88	381,774 10	410,163 23	50,421 49	22,032 36
Cities and districts	$ 1,479,018 33	$287,577 30	$ 124,275 75	$ 411,853 05	$ 436,282 21	$ 50,421 49	$ 25,992 33

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Alberni	$ 32,205 04	$ 546 03	$ 5,805 65	$ 6,351 68	$ 2,531 95	.....	$ 3,819 73
Armstrong	40,214 24	2,896 64	3,032 64	5,929 28	5,888 02	.....	41 26
Cranbrook	182,558 69	3,362 22	16,310 52	19,672 74	19,442 79	.....	229 95
Duncan	25,000 00	1,342 77	2,100 30	3,443 07	4,220 28	$ 777 21	.....
Enderby	21,866 41	1,550 78	1,642 06	3,192 84	2,821 46	.....	371 38
Fernie	114,414 47	3,941 51	8,440 35	12,381 86	19,145 41	6,763 55	.....
Grand Forks	52,500 00	5,103 46	6,771 50	11,874 96	9,096 13	.....	2,778 83
Greenwood	29,958 46	450 07	3,094 10	3,544 17	2,380 00	.....	1,164 17
Kamloops	299,280 69	29,790 28	26,135 99	55,926 27	35,613 20	.....	20,313 07
Kaslo	18,750 00	2,534 13	220 85	2,754 98	3,741 93	986 95	.....
Nanaimo	387,338 02	13,507 18	21,780 92	35,288 10	36,377 10	1,089 00	.....
Nelson	49,570 24	2,550 64	2,740 20	5,290 84	30,587 59	25,296 75	.....
New Westminster	537,752 85	23,979 17	53,575 24	77,554 41	90,503 37	12,948 96	.....
North Vancouver	603,370 88	7,060 84	28,565 63	35,626 47	19,953 10	.....	15,673 37
Port Alberni	157,438 75	1,813 84	12,253 50	14,067 34	6,059 91	.....	8,007 43
Port Coquitlam	43,500 00	3,696 63	6,783 01	10,479 64	3,845 36	.....	6,634 28
Port Moody	77,180 18	1,009 71	6,481 54	7,491 25	4,756 29	.....	2,734 96
Prince George	86,353 19	6,020 10	11,243 67	17,263 77	6,114 75	.....	11,149 02
Rossland	45,000 00	2,126 84	6,857 59	8,984 43	9,937 06	952 63	.....
Salmon Arm	58,416 76	380 33	6,886 64	7,266 97	3,319 13	.....	3,947 84
Slocan	4,790 00	315 20	.....	315 20	354 00	38 80	.....
Trail	100,459 87	5,702 70	9,953 13	15,655 83	15,092 77	.....	563 06
Vancouver	5,148,478 67	169,338 11	245,219 83	414,557 94	470,562 77	56,004 83	.....
Vernon	204,958 42	6,767 65	18,163 29	24,930 94	18,066 93	.....	6,864 01
Victoria	3,237,322 40	42,938 22	219,246 08	262,184 30	218,262 93	.....	43,921 37
Totals	$11,558,678 23	$338,725 05	$ 723,304 23	$1,062,029 28	$1,038,674 23	$104,858 68	$128,213 73

Waterworks—Districts.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Burnaby	$ 698,817 14	$ 27,145 86	$ 46,277 72	$ 73,423 58	$ 30,889 73	.....	$ 42,533 85
Coldstream	113,185 72	4,640 17*	8,439 56	13,079 73	1,864 37	.....	11,215 36
Coquitlam	8,175 42	400 20	1,171 45	1,571 65	493 95	.....	1,077 70
Delta	200,743 91	9,411 75	11,919 95	21,331 70	8,035 38	.....	13,296 32
North Vancouver	168,905 75	7,761 49	12,611 50	20,372 99	8,478 25	.....	11,894 74
Oak Bay	209,948 75	9,360 01	14,553 97	23,913 98	20,222 75	.....	3,691 23
Peachland	8,432 85	215 37	810 93	1,026 30	746 25	.....	280 05
Penticton	152,706 08	1,669 08	11,713 13	13,382 21	15,204 39	$ 1,822 18	.....
Point Grey	1,483,681 30	11,614 90	79,706 05	91,320 95	33,226 69	.....	58,094 26
Richmond	370,133 97	7,298 05	19,174 75	26,472 80	23,489 90	.....	2,982 90
Saanich	389,714 84	13,812 43	33,243 70	47,056 13	24,440 21	.....	22,615 92
South Vancouver	954,387 15	64,024 99	53,997 43	118,022 42	81,227 36	.....	36,795 06
Spallumcheen	43,094 38	533 86	4,162 97	4,696 83	12 00†	.....	4,684 83
West Vancouver	131,997 70	4,795 32‡	9,886 67	14,681 99	4,052 80	.....	10,629 19
Totals	$ 4,933,924 96	$162,683 48	$ 307,669 78	$ 470,353 26	$ 252,384 03	$ 1,822 18	$219,791 41
Cities forward	11,558,678 23	338,725 05	723,304 23	1,062,029 28	1,038,674 23	104,858 68	128,213 73
Cities and districts	$16,492,603 19	$501,408 53	$1,030,974 01	$1,532,382 54	$1,291,058 26	$106,680 86	$348,005 14

* Includes capital expenditure, $590.17, paid from current revenue.
† Installed on local improvement system.
‡ Represents total expenditure, $10,076.09, less capital expenditures from sale of bonds, $5,280.77.

Municipality.	Estimated Value of Plant.	Cost of Maintenance and Operation.	Interest and Sinking Fund.	Total Cost.	Total Revenue.	Profit.	Loss.
Water and Light.							
Kelowna	$ 105,159 06	$ 36,234 90*	$ 12,121 87	$ 48,356 77	$ 42,103 34	.....	$ 6,253 43
Merritt	58,587 60	13,217 01	5,671 37	18,888 38	17,171 03	.....	1,717 35
Prince Rupert	825,458 53	40,433 89	51,631 41	92,065 30	92,481 43	$ 416 13	.....
Revelstoke	259,000 00	28,670 85	25,948 00	54,618 85	49,517 57	.....	5,101 28
Gas.							
Nelson	50,000 00	13,323 20	3,381 68	16,704 88	11,225 98	.....	5,478 90
Irrigation System.							
Penticton	109,326 78	9,505 71	9,373 73	18,879 44	12,531 70	.....	6,347 74
Irrigation and Domestic Water.							
Summerland	333,880 75	12,753 64	24,594 39	37,348 03	24,539 99	.....	12,808 04
Hydro-electric System.							
Kamloops	348,534 76	12,471 35	31,188 12	43,659 47	38,956 25	.....	4,703 22
Ferries.							
North Vancouver	247,538 39	161,453 61	17,518 86	178,972 47	193,291 40	14,318 93	.....
West Vancouver	73,427 36	38,110 28	12,282 98	50,393 26	47,665 01	.....	2,728 25
Street Railway.							
Nelson	84,488 56	16,780 40	7,228 70	24,009 10	18,200 76	.....	5,808 34
Telephone System.							
Prince Rupert	31,363 30	19,450 99	5,434 72	24,885 71	35,212 10	10,326 39	.....
	$2,526,765 09	$402,405 83	$206,375 83	$608,781 66	$582,896 56	$25,061 45	$50,946 55

* Includes capital expenditures from current revenue, $5,811.33.

MUNICIPAL OFFICIALS.

CITIES.

City.	Clerk.	Treasurer.	Mayor.
Alberni	Prescott, W. R. H.		Huff, Capt. G. A.
Armstrong	Fifer, A. J.		Fraser, H. A.
Chilliwack	Brown, Peter J.		Ashwell, J. H.
Courtenay	McCuaig, Robert		Duncan, William.
Cranbrook	Roberts, Thos. M.		Genest, Alfred.
Cumberland	Mordy, T.		MacDonald, D. R.
Duncan	Greig, James		Pitt, Thomas.
Enderby	Rosoman, Graham		Barnes, F. H.
Fernie	Moffatt, A. J.		Henderson, G. G.
Grand Forks	Hutton, John A.		Acres, G. H.
Greenwood	Taylor, G. B.		Gulley, T. M.
Kamloops	Jackson, A. W.		Burton, S. C.
Kaslo	Papworth, Wm. V.		Robb, W. G.
Kelowna	Dunn, G. H.		Sutherland, D. W.
Ladysmith	Morrison, N. A.		Anderson, Wm.
Merritt	Gay, F. S.		Reid, F. A.
Nanaimo	Hackwood, Harold	Gough, S.	McKenzie, H.
Nelson	Wasson, W. E.		McDonald, J. A.
New Westminster	Duncan, W. A.	Gilchrist, R. S.	Johnston, J. J.
North Vancouver	Archibald, R. F.	Lane, C. R.	Vance, G. W.
Phoenix	Perkins, W. X.		Almstrom, Albin.
Port Alberni	Blandy, R. F.		Exton, Edward.
Port Coquitlam	Smith, John		Mars, Arthur.
Port Moody	Lye, J. J.		Roe, Perry D.
Prince George	Tait, D. G.		Perry, H. G.
Prince Rupert	Woods, E. A.	Vance, W. D.	McClymont, Thos.
Revelstoke	Gordon, W. A.		Bews, Walter.
Rossland	McLeod, J. A.		Pitt, A. R.
Salmon Arm	Lingford, R.		Clingan, F. W.
Slocan	Graham, Wm. E.		Swan, Peter.
Trail	Moneypenny, W. E. B.		Dockerill, F. E.
Vancouver	McQueen, W.	Johnstone, J.	Gale, R. H.
Vernon	Edwards, J. G.		Fitzmaurice, R.
Victoria	Bradley, E. W.	Smith, E. C.	Porter, R. J.

DISTRICTS.

District.	Clerk and Treasurer.	Reeve.	Address.
Burnaby	Moore, Arthur G.	Sanderson, Thos.	Edmonds.
Chilliwhack	Webb, Chas. W.	Evans, J. A.	Chilliwack.
Coldstream	Henderson, E.	Cunliffe, E. H.	Vernon.
Coquitlam	Newman, Robert	Marmont, L. E.	Maillardville.
Delta	McDiarmid, N. A.	Williamson, J. A.	Ladner.
Esquimalt	Pullen, G. H.	Lockley, Alex.	Esquimalt.
Fraser Mills	Stewart, G. G.	Scott, Dr. R. H.	Fraser Mills.
Kent	Fooks, Harry	Morrow, J. A. H.	Agassiz.
Langley	Payne, R. A.	Poppy, David W.	Murrayville.
Maple Ridge	McFarlane, J. C.	Ansell, W. H.	Port Haney.
Matsqui	LeFeuvre, John	McCallum, Alex.	Aldergrove.
Mission	Barr, J. A.	Catherwood, J. A.	Mission City.
North Cowichan	Crane, C. S.	Herd, A. A. B.	Duncan.
North Vancouver	Farmer, John G.	Bridgman, E. H.	North Vancouver.
Oak Bay	Ross, O. W.	Drake, S. J.	Oak Bay.
Peachland	Dryden, Wm. M.	Hogg, R. J.	Peachland.
Penticton	Bracewell, B. C.	Chambers, E. J.	Penticton.
Pitt Meadows	McDermott, W.	Park, W. J.	Pitt Meadows.
Point Grey	Floyd, Henry	Pearson, Thomas	Kerrisdale.
Richmond	Shepherd, S.	Bridge, William	Eburne.
Saanich	Cowper, H. S.	Watson, G. F.	Royal Oak.
Salmon Arm	Lacey, John E.	Harbell, Joseph	Salmon Arm.
South Vancouver	Riley, Wm. T.	*Gillespie, F. J.	South Vancouver.
Spallumcheen	Wiglesworth, J. R.	Hassen, Matthew	Armstrong.
Sumas	Yarwood, C. G.	Fooks, Fred	Huntingdon.
Summerland	Nixon, F. J.	Campbell, J. R.	Summerland.
Surrey	Lemax, C.	Sullivan, Thos. J.	Cloverdale.
West Vancouver	Ollason, James	Vinson, V. V.	Hollyburn.

* Commissioner.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

RETURN

Of Moneys received and paid by the Official Administrator of the Province as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

JOHN HART,
Minister of Finance.

Treasury,
April 14th, 1920.

COUNTY COURT, DISTRICT OF VICTORIA.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ELIZABETH A. BEE.

1919.			
Feb. 27.	To W. Monteith, commission..	$ 4	30
July 2.	Bass & Bullock Webster, legal expenses	5	00
	W. Monteith, postages and sundry petty expenses ..	1	00
	Alfred Bee, balance at credit of estate	127	57

ESTATE OF PETER (OR MICHAEL) BRAZIL.

1919.			
Feb. 27.	To W. Monteith, commission ..	$ 4	55
Mar. 18.	Probate duty	9	21
Mar. 21.	Funeral expenses	120	00
Mar. 28.	Advertising	5	25
Mar. 31.	McIntosh & Meredith, legal expenses	36	80
	W. Monteith, commission ..	49	36
April 4.	T. R. McLeod, claim	18	00

ESTATE OF R. J. BACKHOUSE.

1919.			
Aug. 28.	To W. Monteith, commission ..	$ 109	24
	Exchange on draft		10
Sept. 4.	Times Printing & Publishing Co., advertising	2	80
	B. H. T. Drake, probate duty	20	00
Sept. 30.	H. A. Beckwith, legal expenses	62	65
	W. Monteith, commission ..	1	75
	W. Monteith, postages and sundry petty expenses ..	1	44
Oct. 1.	Eliza Backhouse	168	20
	Mary D. Poppleton	606	22
	Sydney Chas. Backhouse ..	606	22
	Cyril Croft Backhouse	606	22

ESTATE OF FREDERICK J. COLMAN.

1919.			
Jan. 10.	To W. Monteith, commission..	$ 315	48

ESTATE OF EDWARD P. COLLEY.

1919.			
June 5.	To W. Monteith, commission..	$ 10	66
	W. Couldwell, taxes on real estate	223	64
July 21.	W. Couldwell, balance taxes on real estate	1	00
Aug. 26.	A. G. Freeze, taxes on real estate	23	37
	W. Monteith, commission..		53
Sept. 18.	R. R. Blandy, balance taxes on real estate	1	88
Oct. 17.	W. Monteith, commission..	1	25
	Taxes, real estate	5	46

CR.

ESTATE OF ELIZABETH A. BEE.

1919.			
Jan. 5.	By Sale of effects	$ 76	20

ESTATE OF PETER (OR MICHAEL) BRAZIL.

1919.			
Jan. 20.	By Canadian Northern Railway Co.	$ 91	12
Mar. 18.	Royal Bank	987	15

ESTATE OF R. J. BACKHOUSE.

1919.			
Aug. 8.	By Militia Department	$ 184	84
Aug. 16.	Crown Life Insurance Co...	2,000	00

ESTATE OF FREDERICK J. COLMAN.

1919.			
Jan. 4.	By Granby Consolidated Smelting Co.	$6,309	59

ESTATE OF EDWARD P. COLLEY.

1919.			
May 30.	By Wm. Fry & Sons	$ 213	30
Aug. 25.	Refund of commission charged in error *per contra*	10	66
Sept. 2.	R. S. Day	25	00

DR.

ESTATE OF JOHN CURRIE.

1919.			
Nov. 20.	To Locksmith	$	25

ESTATE OF HANNAH G. CHANDLER.

1919.			
Mar. 28.	To Advertising	$	5 25
Mar. 31.	W. Monteith, commission		4 34
June 23.	Henry Roberts, claim		13 25

ESTATE OF JOSEPH ARTHUR EARLE CHANDLER.

1919.			
Mar. 28.	To Advertising	$	5 25
	Coroner's fee		2 50
Mar. 31.	B.C. Funeral Co., Ltd., account funeral expenses		60 00
	Nunn, Thomson & Clegg, account funeral expenses		81 00
	W. Monteith, commission		93 87
April 8.	Bodwell & Lawson, legal expenses		21 33
May 5.	W. Monteith, commission		109 58
May 7.	Dr. J. W. Lennox, claim		6 00
May 20.	Copy of order		1 00
June 5.	W. Monteith, commission		2 50
	Notarial fee		50
Sept. 4.	R. D. Chandler, claim		89 93
Sept. 6.	" "		196 26
	R. D. Chandler, on account claim		500 00
Oct. 17.	W. Monteith, commission		7 37

ESTATE OF JAMES H. DAVIES.

1919.			
Jan. 2.	To Advertising	$	10 50
Jan. 10.	W. Monteith, commission		71 72
Feb. 27.	W. Monteith, refund amount paid for advertising		10 50
July 5.	W. Monteith, commission		15 00
Aug. 5.	W. Monteith, postages and sundry petty expenses		2 00
	White & Martin, amount due heirs		1,647 40

ESTATE OF ELIZABETH EARLE.

1919.			
June 30.	To Taxes on real estate, Vancouver	$	53 33
Oct. 22.	Taxes on real estate, Vancouver		40 62
Jan. 10.	W. Monteith, commission		1 14
Nov. 5.	" "		7 80

ESTATE OF THOS. L. HORN.

1919.			
June 5.	To W. Monteith, commission	$	1 00
Oct. 29.	W. Monteith, postages and sundry petty expenses		1 00
	Wise & Co., balance due heir		72 33

ESTATE OF H. IMOTO.

1919.			
Aug. 16.	To Exchange on cheque	$	20
Aug. 19.	Colonist Printing & Publishing Co., advertising		3 00
	Legal expenses		20 60
Feb. 18.	Bass & Bullock Webster, bill of costs (additional)		11 00
Aug. 19.	District Registrar, Supreme Court, probate duty		1 86
Aug. 26.	W. Monteith, commission		7 97
Nov. 5.	" "		13

ESTATE OF MALCOLM LAMONT.

1919.			
Jan. 14.	To Dr. A. E. McMicking, claim	$	25 00
	F. J. Williams, claim		1 00
	Pelton Publishing Co.		3 00
Feb. 27.	W. Monteith, commission		56
Feb. 28.	W. Monteith, postages and sundry petty expenses		1 80
	C. F. Davie, agent of heirs		878 52

ESTATE OF DANIEL MCPHERSON.

1919.			
Mar. 26.	To Legal expenses	$	31 15
Mar. 31.	W. Monteith, commission		3 00

CR.

ESTATE OF JOHN CURRIE.

1919.			
Nov. 24.	By Jubilee Hospital	$	42 95
Dec. 18.	Bank of British North America		771 00

ESTATE OF HANNAH G. CHANDLER.

1919.			
Mar. 14.	By Bodwell & Lawson	$	86 83

ESTATE OF JOSEPH ARTHUR EARLE CHANDLER.

1919.			
Mar. 18.	By Life-insurance claim	$1,877	29
April 4.	Bank of British North America	2,191	60
May 26.	G. Thompson	50	00
Sept. 8.	A. W. Jones, Ltd.	142	41

ESTATE OF JAMES H. DAVIES.

1919.			
Jan. 7.	By War bond sold	$	52 00
Mar. 15.	Treasury (refund)		10 50
June 12.	White & Martin		300 00

ESTATE OF ELIZABETH EARLE.

1919.			
June 28.	By A. W. Jones, Ltd., for rents	$	52 30
Oct. 22.	" " "		58 50

ESTATE OF THOS. L. HORN.

1919.			
May 17.	By Rent	$	20 00

ESTATE OF H. IMOTO.

1919.			
Aug. 19.	By Nippon Kinyu Sha	$	159 30
Oct. 14.	Canadian Pacific Rly. Co.		2 50

ESTATE OF MALCOLM LAMONT.

1919.			
Feb. 3.	By Effects sold	$	11 25

ESTATE OF DANIEL MCPHERSON.

1919.			
Mar. 26.	By W. H. Whittaker	$	60 15

DR.

1919.		ESTATE OF ANNIE MCKENZIE.	
Jan. 10.	To	W. Monteith, commission..	$ 17 00
Feb. 27.		" " ..	29 26
May 5.		" " ..	1 25
June 5.		" " ..	5 81
June 23.		Wise & Co., fire-insurance premium	10 00
July 5.		W. Monteith, commission..	1 18
July 31.		" " ..	1 25
Oct. 8.		O. W. Ross, taxes on real estate	197 69
		T. H. Leeming, taxes on real estate	186 85
Oct. 17.		W. Monteith, commission..	2 50
Nov. 5.		" " ..	53 12
Dec. 17.		" " ..	39 80

1919.		ESTATE OF EMMA RALPH.	
Mar. 28.	To	Advertising	$ 4 50
Mar. 31.		Sands Funeral Furnishing Co.	191 00
		W. Monteith, commission ..	111 30
April 11.		Crease & Crease, legal expenses	68 50
April 23.		Deputy District Registrar, probate and succession duty	798 57
May 5.		W. Monteith, commission ..	111 96
May 7.		W. Monteith & Co., Ltd., fire-insurance premium ..	15 00
		Melrose Co., Ltd., per account	3 71
May 9.		Carter Electric Co., Ltd., per account	35 82
June 5.		W. Monteith, commission ..	75
June 10.		Hickman Tye Hardware Co., per account	25 50
June 24.		John Ralph, claim	100 00
July 9.		W. Monteith, commission ..	71
July 29.		Crease & Crease, legal expenses	31 05
Aug. 26.		W. Monteith, commission ..	75
Aug. 28.		O. W. Ross, taxes, Oak Bay property	123 54
Oct. 17.		W. Monteith, commission ..	4 00
Nov. 5.		" " ..	3 75
Nov. 27.		E. C. Smith, taxes, Victoria City property	21 17
Dec. 17.		W. Monteith, commission ..	75

1919.		ESTATE OF MARGARET ROBERTSON.	
June 5.	To	W. Monteith, commission ..	$ 10 26
June 10.		Colonist Printing & Publishing Co., Ltd., advertising	2 80
June 13.		J. P. Walls, legal expenses	29 07
June 16.		Dr. R. L. Fraser, claim ...	10 00
		B.C. Funeral Co., funeral expenses	123 50
Nov. 6.		Jessie Lewis, claim	25 00

1919.		ESTATE OF GILLES L. SERRAND.	
Jan. 10.	To	W. Monteith, commission ..	$ 1 70

1919.		ESTATE OF CHRISTOPHER STAFFORD.	
Jan. 10.	To	W. Monteith, commission ..	$ 70
May 3.		" " ..	1 05
July 5.		" " ..	70
Oct. 16.		R. R. F. Sewell, taxes	7 42
Oct. 17.		W. Monteith, commission ..	70
Dec. 17.		" " ..	1 05

1919.		ESTATE OF RICHARD SHORE.	
Jan. 14.	To	Wm. T. Shore, next of kin, on account	$1,000 00
May 5.		W. Monteith, commission ..	9 40
June 5.		" " ..	2 35
Aug. 29.		Edwin C. Smith, taxes, real estate	95 22
		R. R. F. Sewell, taxes, real estate	90 43
Oct. 17.		W. Monteith, commission ..	2 00
Nov. 5.		" " ..	47
Dec. 9.		" " ..	150 62

CR.

1919.		ESTATE OF ANNIE MCKENZIE.	
Jan. 8.	By	Mrs. J. Gillies	$ 340 00
Jan. 14.		Lee & Fraser	533 25
Feb. 20.		Burdick Bros. & Brett, account rents	43 75
April 2.		Burdick Bros. & Brett, account rents	23 75
May 9.		Burdick Bros. & Brett, account rents	7 75
May 10.		Lee & Fraser, per account	25 00
		"	38 00
May 26.		Burdick Bros. & Brett, account rents	23 75
June 28.		Burdick Bros. & Brett, account rents	23 75
July 23.		Burdick Bros. & Brett, account rents	23 75
Aug. 27.		Burdick Bros. & Brett, account rents	20 48
Sept. 27.		Burdick Bros. & Brett, account rents	13 90
Oct. 23.		Lee & Fraser, per account..	1,039 85
Oct. 31.		Burdick Bros. & Brett, account rents	22 50
Nov. 3.		Lee & Fraser, per account..	38 00
Nov. 6.		Mrs. J. Gillies, per account	664 20

1919.		ESTATE OF EMMA RALPH.	
Mar. 24.	By	Bank of Montreal	$2,226 01
April 8.		Account rents	200 00
April 23.		Proceeds auction sale, furniture, etc. (less expenses)	394 55
		Account rents	11 50
April 24.		Dominion savings-book	1,455 18
May 27.		Account rents	14 25
July 3.		"	14 25
Aug. 9.		"	14 25
Sept. 19.		"	50 00
Sept. 22.		"	25 50
Oct. 24.		"	75 00
Nov. 13.		"	14 25
Dec. 12.		"	14 25

1919.		ESTATE OF MARGARET ROBERTSON.	
May 30.	By	Canadian Bank of Commerce	$ 205 20

1919.		ESTATE OF GILLES L. SERRAND.	
Jan. 6.	By	Empire Trust	$ 34 14

1919.		ESTATE OF CHRISTOPHER STAFFORD.	
Jan. 2.	By	Rent	$ 14 00
April 1.		"	21 00
June 28.		"	14 00
Oct. 2.		"	14 00
Nov. 15.		"	19 95

1919.		ESTATE OF RICHARD SHORE.	
April 30.	By	Yates & Jay, per account ..	$ 178 60
May 8.		" " ..	38 00
May 9.		Rent, less expenses, per account	2 00
Aug. 29.		Yates & Jay, per account ..	38 00
Oct. 30.		Rent	9 50
Dec. 31.		"	9 50

DR.

ESTATE OF LAURA M. SEYMOUR.

1919.			
Jan. 1.	To Copy of order	$ 1	00
April 22.	Exchange on cheque		50
Feb. 27.	W. Monteith, refund	1	00
May 5.	W. Monteith, commission	21	35
Aug. 19.	McIntosh & Meredith, legal expenses	11	80
Oct. 17.	M. Monteith, commission	7	50
Dec. 17.	" "	2	37

ESTATE OF W. W. SHILLINGLAW.

1919.			
Mar. 21.	To Advertising	$ 4	20
Mar. 31.	W. Monteith, commission	46	89
April 8.	Bodwell & Lawson, legal expenses	103	37
Aug. 1.	Burdick Bros. & Brett, premium on bond	20	00
Aug. 26.	W. Monteith, commission	25	00
Sept. 22.	Bodwell & Lawson, account next of kin, per order	39	10
Oct. 8.	Bodwell & Lawson, legal expenses	17	00
Dec. 3.	Bodwell & Lawson, legal expenses	2	00
	W. Monteith, postages and sundry petty expenses	1	50
	R. W. Shillinglaw	1,178	64

ESTATE OF LOUIS SANDERS.

1919.			
April 11.	To Copy of order	$ 1	00
April 23.	Advertising	4	50
May 5.	W. Monteith, commission	29	00
May 7.	Sands Funeral Furnishing Co., funeral expenses	136	00
	Sands Funeral Furnishing Co., claim *re* estate of deceased wife	91	50
	C. G. White, legal expenses	35	15
	Cameron & Calwell, claim	5	00
June 22.	White & Martin, legal expenses (additional)	23	05
June 5.	W. Monteith, commission	10	90
June 24.	W. Monteith, postages and sundry petty expenses	1	00
	Official Guardian	460	64

ESTATE OF WILLIAM P. SMITH.

1919.			
June 5.	To W. Monteith, commission	$ 11	15
June 12.	Elliott, Maclean & Shandley, account interest on mortgage, etc., per account	127	00
June 20.	Copy of order	1	00
June 17.	Certificate of birth	2	50
July 17.	Elliott, Maclean & Shandley, interest on mortgage	35	00
July 5.	W. Monteith, commission	22	45
July 31.	" "	2	20
Oct. 17.	" "	3	00
Nov. 6.	F. A. Smith, share of taxes on real estate	91	50
Nov. 12.	F. A. Smith, claim	47	77

ESTATE OF HONG SOON, ALIAS AH SING.

1919.			
July 21.	To Funeral expenses	$ 80	00
July 31.	Advertising	3	50
	W. Monteith, commission	30	84
Aug. 8.	White & Martin, legal expenses	31	05
Aug. 26.	W. Monteith, commission		19

ESTATE OF OLGA M. VALE.

1919.			
Dec. 17.	To W. Monteith, commission	$ 5	00

ESTATE OF JULIAN A. WILLIAMS.

1919.			
Feb. 21.	To Copy of order	$ 1	00
	Probate duty	2	59
	Legal expenses	52	95
Feb. 25.	Advertising	4	20
Feb. 27.	W. Monteith, commission	18	75
Mar. 31.	" "		75
June 11.	B.C. Funeral Co.	100	00
Nov. 10.	E. A. King, claim	18	75
	W. Monteith, postages and sundry petty expenses	1	00
	A. H. Marriott	190	03

CR.

ESTATE OF LAURA M. SEYMOUR.

1919.			
April 19.	By I.O.O.F., account life-insurance claim	$ 427	50
Sept. 3.	Sun Life Insurance Co., balance claim	150	00
Nov. 10.	I.O.O.F., balance claim	47	35

ESTATE OF W. W. SHILLINGLAW.

1919.			
Mar. 18.	By Bank of Montreal	$ 937	70
Aug. 9.	British Yukon Navigation Co.	500	00

ESTATE OF LOUIS SANDERS.

1919.			
April 19.	By Bank of Montreal	$ 579	84
May 17.	Lummi Bay Packing Co.	217	90

ESTATE OF WILLIAM P. SMITH.

1919.			
May 27.	By A. S. Barton, per account	$ 198	35
June 4.	Aetna Assurance Co.	10	40
June 20.	H. L. Faulkner	438	70
July 25.	Auction sale of effects	37	10
Sept. 8.	A. S. Barton, per account	56	97

ESTATE OF HONG SOON, ALIAS AH SING.

1919.			
July 14.	By Police	$ 164	70
July 17.	Bank of British North America	150	87
	Royal Bank of Canada	205	31
July 25.	Auction sale of effects	81	60
July 31.	Sale of Jap coins	3	75

ESTATE OF OLGA M. VALE.

1919.			
Nov. 17.	By Quit claim	$ 100	00

ESTATE OF JULIAN A. WILLIAMS.

1919.			
Feb. 21.	By Royal Bank of Canada	$ 375	02
Mar. 11.	Sale of effects	15	00

DR.

ESTATE OF EFFIE WILLIAMS.

1919.			
Jan. 8.	To Copy of order	$ 1	00
Jan. 10.	W. Monteith, commission	9	70
Jan. 16.	C. G. White, legal expenses	31	40
	Times Printing & Publishing Co., advertising	10	50
Feb. 27.	W. Monteith, commission		60
	Water rates	4	22
Mar. 11.	„	2	22
Mar. 3.	W. Monteith, commission		30
April 8.	Water rates	1	78
May 5.	W. Monteith, commission	2	80
May 7.	Victoria Water Works	2	00
June 5.	W. Monteith, commission	1	55
June 16.	Victoria Water Works	2	00
July 2.	„ „	2	45
July 21.	Pemberton & Son	5	00
July 28.	E. C. Smith, taxes	38	00
	Chas. Fletcher, refund of taxes	17	46
July 5.	W. Monteith, commission	1	20
July 31.	„ „	90	92
	Victoria Water Works	2	72
	Moore-Whittington Lumber Co., claim	336	63
	White & Martin, legal expenses	32	95
	Duck & Johnston, claim	11	00
	W. Monteith, postages and petty expenses	1	25
Aug. 7.	Official Guardian, per order of Court	1,326	06
Aug. 26.	W. Monteith, commission		32

ESTATE OF NICHOLAS ZAFIRIS.

1919.			
Jan. 10.	To W. Monteith, commission	$ 1	98
Jan. 20.	Times Printing & Publishing Co., advertising	10	20
April 9.	V. Paul, claim	299	00

CR.

ESTATE OF EFFIE WILLIAMS.

1919.			
Jan. 2.	By W. O. Goddard ...$194 15 Less sundry debts paid by him... 103 60	$ 90	55
Jan. 27.	Rents	6	00
Feb. 17.	„	6	00
Mar. 11.	„	6	00
April 1.	„	6	00
April 2.	„ (less expenses)	44	44
May 1.	„	6	00
May 14.	„	6	00
	„ (less expenses)	23	96
June 2.	„	6	00
June 20.	„ (less expenses)	11	88
July 2.	„	6	00
July 15.	„	11	88
July 25.	Sale of real estate (less brokerage)	1,710	00
Aug. 1.	Return fire-insurance premium	6	50

W. MONTEITH,
Official Administrator.

KASLO AND SLOCAN ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF FRANCESCO ALBERICI.

1919.			
May 19.	To R. J. Stenson	$ 1	60
June 13.	Donaghy & Donaghy	32	00
June 26.	R. J. Stenson	12	50
	G. Trickett	75	00
June 27.	A. McQueen	6	70
July 23.	O. T. Stone	1	00
Aug. 27.	„	1	00
Nov. 19.	G. H. Gauthier	45	28
	R. J. Stenson	51	94

ESTATE OF J. SESIL ABRIMAK.

1919.			
July 12.	To S. J. Towgood	$ 2	00

ESTATE OF JOHN BARBARO.

1919.			
April 26.	To The "Kootenaian"	$ 6	40
	Donaghy & Donaghy	38	00
April 29.	G. Trickett	150	00
	District Registrar of Titles	1	00
May 2.	A. McQueen	45	69
May 5.	R. J. Stenson	129	47
May 19.	„	1	10
May 29.	Sandon Miners' Hospital	16	25
June 17.	R. Bolton	7	31
June 27.	R. Newman	2	00
Sept. 11.	R. J. Stenson	23	58
Nov. 21.	„	1	12

CR.

ESTATE OF FRANCESCO ALBERICI.

1919.			
April 2.	By Surprise Mining Co.	$ 94	25
June 12.	Bank of Montreal	156	04
Nov. 19.	Bank of Toronto	1,038	80

ESTATE OF J. SESIL ABRIMAK.

1919.			
July 3.	By Chief Constable	$ 11	56

ESTATE OF JOHN BARBARO.

1919.			
April 17.	By J. M. Harris	$ 500	00
May 5.	Sale $2,000 Victory Bonds	1,980	00
	Bank of Montreal	27	00
	J. M. Harris	82	65
May 10.	Bank of Montreal	55	00
May 22.	J. McK. Boates	14	00
Sept. 11.	J. M. Harris	397	72
July 7.	A. A. Taylor	5	00
Oct. 3.	A. Taylorson	2	50
Nov. 7.	A. Anderson	20	00

DR.

ESTATE OF ANTONIO BRUSTOLINI.

1919.			
July 9.	To T. M. Bowman	$	2 00
July 10.	Donaghy & Donaghy		48 04
July 12.	R. J. Stenson		38 05
July 15.	D. St. Denis		5 00
July 23.	G. Trickett		110 00
July 29.	T. H. Wilson		4 50
Aug. 4.	"Kootenaian"		6 60
Aug. 12.	Sandon Miners' Hospital		9 50
Aug. 26.	J. Cechelero		330 75
Oct. 31.	M. Zadra		5 00

ESTATE OF GUISEPPI (JOSEPH) CERVA.

1919.			
May 5.	To R. J. Stenson	$	66 32
	"Kootenaian"		7 20
May 16.	Donaghy & Donaghy		35 35
May 27.	Geo. Trickett		75 00
	A. McQueen		4 80
June 6.	J. Cechelero		50 00
Oct. 31.	M. Zadra		5 00

ESTATE OF MORRIS DAVIES.

1919.			
June 26.	To R. J. Stenson	$	6 25
Aug. 2.	T. H. Wilson		7 05
Aug. 11.	J. B. Smith		37 75
	Donaghy & Donaghy		14 05
Aug. 27.	" "		1 30
Sept. 10.	" "		2 50
Sept. 5.	Angell Hardware Co.		7 35
Oct. 2.	Silverton Lumber Co.		46 50

ESTATE OF JAMES HUNT.

1919.			
May 7.	To Assessor, etc.	$	8 30
Nov. 21.	R. J. Stenson		5 83

ESTATE OF OSCAR JOHNSON.

1919.			
Mar. 24.	To Assessor, etc.	$	4 44
Nov. 4.	J. Blomberg		4 38

ESTATE OF JOSEPH EDWARDS.

1919.			
Jan. 22.	To T. O. Wilson	$	50 00
Feb. 15.	"		41 00
	A. McQueen		4 50
Feb. 20.	Donaghy & Donaghy		21 75
	R. J. Stenson		38 58
Mar. 3.	"Kootenaian"		7 80
Mar. 10.	R. J. Stenson		5 55

ESTATE OF ALSJIR JOHNSON.

1919.			
May 17.	To R. J. Stenson	$	4 35

ESTATE OF JOHN KRUPPA.

1919.			
July 9.	To Hamilton & Wragge	$	18 35

ESTATE OF JACOB KELSEN.

1919.			
May 23.	To R. J. Stenson	$	2 85
June 25.	"		2 85
July 18.	"		2 88
July 29.	Sandon City taxes		10 91
	A. McQueen		16 00
	R. J. Stenson		25 45
Aug. 26.	J. McK. Boates		30 00
Aug. 29.	Donaghy & Donaghy		56 55
Sept. 8.	A. McQueen		7 40
Sept. 11.	R. J. Stenson		21 58
Sept. 27.	S. J. Towgood		5 00
	McDonald & Co.		81 18
	McKay, Smith & Blair		391 63
	J. C. Harris		24 00
	Slocan Mercantile Co.		4 75
	L. O. Grothe, Ltd.		28 50
Sept. 30.	H. S. Whellams		5 00
Sept. 8.	J. Grier		11 00

ESTATE OF NELS LARSON.

1919.			
May 5.	To R. J. Stenson	$	2 82
May 7.	Slocan Mercantile Co.		8 95

CR.

ESTATE OF ANTONIO BRUSTOLINI.

1919.			
Mar. 27.	By J. McK. Boates	$	1 80
July 9.	Bank of Montreal		253 64
July 14.	" "		20
July 12.	D. St. Denis		506 00

ESTATE OF GUISEPPI (JOSEPH) CERVA.

1919.			
April 30.	By Bank of Montreal	$	1,326 58

ESTATE OF MORRIS DAVIES.

1919.			
June 19.	By A. McInnes	$	125 00
Oct. 1.	"		29 95

ESTATE OF JAMES HUNT.

1919.			
Aug. 2.	By O. Jacobson	$	24 85
Oct. 8.	D. LeBeau		2 35

ESTATE OF JOSEPH EDWARDS.

1919.			
Feb. 15.	By Bank of Montreal	$	407 74
	A. Taylorson		8 00
Feb. 18.	Sale of shack and lot		180 00
	" boat and boat-house		90 00
	" watch and chain		11 00
	" rifle		5 00
Mar. 1.	" tools		6 00
Mar. 10.	" City bond		105 00
April 28.	" shoes, etc.		5 00
July 10.	" watch-chain and charm		7 50
July 17.	" small battery		2 00

ESTATE OF ALSJIR JOHNSON.

1919.			
Feb. 27.	By Constable Gunn	$	57 00
Mar. 27.	Bank of Montreal		30 35
Aug. 22.	H. S. Whellams		5 00

ESTATE OF JACOB KELSEN.

1919.			
May 13.	By J. McK. Boates	$	179 50
May 23.	J. M. Harris		7 50
June 12.	A. McMillan		23 50
July 2.	A. McQueen		1 25
	T. O. Wilson		297 41
Aug. 6.	J. M. Harris		30 00
Sept. 9.	"		401 60
Nov. 4.	B. V. Carter		20 00

ESTATE OF NELS LARSON.

1919.			
Feb. 14.	By Surprise Mining Co.	$	41 25
Mar. 31.	Sevy. Miners' Union		15 15

DR.

ESTATE OF LEANDRE LAURIN.

1919.			
April 26.	To A. McQueen	$ 11	10
	Donaghy & Donaghy	46	50
	"Kootenaian"	6	00
May 5.	R. J. Stenson	27	84
June 19.	A. McQueen	1	00
July 28.	R. J. Stenson	199	88
	A. McQueen	2	50
Aug. 7.	R. J. Stenson	4	60
Aug. 12.	H. S. Whellams	3	50
Aug. 26.	Donaghy & Donaghy	18	60
	White & Randall	83	24

ESTATE OF LEOPOLD LISSA.

1919.			
June 26.	To G. Trickett	$ 20	00
	R. J. Stenson	77	50
July 15.	Donaghy & Donaghy	113	31
	Registrar, Births, Deaths, and Marriages		75
Aug. 4.	"Kootenaian"	6	40
Oct. 31.	M. Zadra	5	00
Nov. 21.	R. J. Stenson	1	87

ESTATE OF GUISEPPI LOSCO.

1919.			
June 26.	To G. Trickett	$ 110	00
	Slocan Hospital	12	00
	Dr. Gomm	20	00
	R. J. Stenson	57	70
July 15.	Donaghy & Donaghy	93	54
	Registrar, Births, Deaths, and Marriages		75
Aug. 4.	"Kootenaian"	6	60
Oct. 31.	M. Zadra	5	00

ESTATE OF J. P. MILLER.

1919.			
Mar. 10.	To Donaghy & Donaghy	$ 32	28
	"Kootenaian"	16	00
	A. T. Garland	50	60
	P. H. Walsh	18	00
	W. E. Hodder	2	00
	G. H. Murhard	34	65
	J. Speirs	153	00
	A. Shutty	150	00
	H. Calvert	5	75
	O. Larson	50	00
	Reuter & Latham	25	00
	O. Jacobson	58	10
	R. J. Stenson	59	90
	H. Giegerich	1,000	39
	R. J. Stenson	90	00
	H. S. Whellams	10	00
	Danish Consul	1,104	30

ESTATE OF JOHN MCNEIL.

1919.			
May 3.	To R. J. Stenson	$ 7	80
June 7.	Kaslo City	38	70
Nov. 25.	W. V. Papworth	3	50
	R. J. Stenson	10	75

ESTATE OF EDWARD E. ROBINSON.

1919.			
May 3.	To Donaghy & Donaghy	$ 36	35
May 19.	A. McQueen	21	73
	R. J. Stenson	84	28
	G. Trickett	299	20
May 26.	A. McQueen	1	00
May 28.	Collector, South Vancouver	27	89
May 31.	A. McQueen	5	00
June 6.	"Kootenaian"	6	60
June 10.	A. Farmer	3	97
June 12.	C. Lomax	4	35
July 18.	R. J. Stenson	2	87
July 29.	"	19	48
Aug. 13.	W. A. Sheppard	16	66

ESTATE OF HARRY SAMSUM.

1919.			
May 3.	To R. J. Stenson	$	75

ESTATE OF IGNACE SANGLEY.

1919.			
April 26.	To Donaghy & Donaghy	$ 42	00
	A. McInnes	2	50
	A. McQueen	19	49
	"Kootenaian"	6	40
	R. J. Stenson	73	71

CR.

ESTATE OF LEANDRE LAURIN.

1919.			
April 11.	By Cash	$ 15	85
April 12.	T. H. Wilson	486	47
April 16.	Bank of Montreal	48	60
May 16.	Sale of shack and lot	65	00
July 23.	Bank of Montreal, Spokane	2,192	75
Aug. 11.	Land Registrar	4	60

ESTATE OF LEOPOLD LISSA.

1919.			
June 26.	By Bank of Montreal	$1,550	39
July 1.	"	7	66
July 4.	Van-Roi Development Co.	29	92

ESTATE OF GUISEPPI LOSCO.

1919.			
May 27.	By G. M. Gunn	$ 27	00
June 26.	Bank of Montreal	308	85
	Bank of Commerce	818	62
July 2.	Bank of Montreal	1	50

ESTATE OF J. P. MILLER.

1919.			
Mar. 8.	By Cork-Province stock	$1,048	00
Mar. 26.	H. Giegerich	1,800	00

ESTATE OF JOHN MCNEIL.

1919.			
April 8.	By P. Perkins	$ 50	00
May 5.	"	7	50
Aug. 5.	"	7	50
Oct. 8.	"	7	50
Nov. 25.	A. Looby	200	00

ESTATE OF EDWARD E. ROBINSON.

1919.			
May 13.	By Bank of Montreal	$1,677	63
May 28.	Bank of Commerce	289	38
July 1.	Refund on taxes		36
July 28.	T. Binish	100	00

ESTATE OF IGNACE SANGLEY.

1919.			
April 16.	By Bank of Montreal	$1,474	39
May 26.	R. B. Ellis	5	78

DR.

ESTATE OF ULISSE STEDILE.

1919.			
June 26.	To G. Trickett	$	25 00
	R. J. Stenson		26 20
July 15.	Donaghy & Donaghy		57 02
	Registrar, Births, Deaths, and Marriages		75
Aug. 4.	"Kootenaian"		6 80
Oct. 31.	M. Zadra		5 00
	R. J. Stenson		1 50

ESTATE OF WM. PEEL SIMPSON.

1919.			
Nov. 21.	To R. J. Stenson	$	2 72

ESTATE OF STEPHEN WOODS.

1919.			
Aug. 30.	To Ole Lermo	$	10 00
Nov. 21.	R. J. Stenson		3 19

CR.

ESTATE OF ULISSE STEDILE.

1919.			
June 26.	By Bank of Montreal	$	524 51
July 2.	" "		2 59
July 5.	Van Roi Mine		27 43

ESTATE OF WM. PEEL SIMPSON.

1919.			
July 2.	By A. McInnes	$	54 50

ESTATE OF STEPHEN WOODS.

1919.			
Aug. 1.	By O. Lermo	$	49 90
Aug. 7.	Hospital		14 00

ESTATE OF ALBERT ZAVAN.

1919.			
May 23.	By J. McK. Boates	$	2 30

R. S. STENSON,
Official Administrator.

KAMLOOPS ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ROBERT BUNT.

1919.			
Jan. 3.	To Exchange	$	05
Jan. 9.	City of Kamloops, water rate		13 80
Jan. 28.	Commission deducted by J. & R.		2 00
	H. Giddens, repair		3 50
	Northern Transfer		4 95
Feb. 26.	Commission		1 00
Mar. 1.	Exchange		05
Mar. 28.	Commission		1 00
April 1.	Exchange		05
April 5.	Fee for L. of A.		10
	Fee for filing in L.R.O.		50
April 25.	Commission		1 00
April 7.	Sewer rental		1 00
April 8.	Kamloops "Telegram"		4 00
May 1.	Exchange		2 25
May 3.	City of Kamloops		181 80
	" "		97 20
	" "		7 43
	"		1 00
	F. T. C., 5% on $1,937.50		96 87
May 16.	District Registrar		1,280 31
May 6.	Genier, taxes		17 70
May 27.	J. & R., commission		1 00
June 6.	City of Kamloops		228 51
June 24.	J. & R., commission		1 00
July 28.	" "		1 00
Aug. 30.	" "		1 00
Sept. 8.	Exchange		05
Oct. 30.	J. & R., commission		2 00
Nov. 28.	" "		1 00
Dec. 30.	" "		1 50
	J. Hodgson, repair account deducted		15 55

ESTATE OF DAISY MARY BRIANT.

1919.			
Jan. 8.	To "Telegram" *re* account	$	6 50
Feb. 10.	Certified copy of letters of administration for mother		1 00
	Certified copy of letters of administration for bond		1 00
Dec. 1.	Minister of Finance, Ottawa, fee on transfer of bond from registered to bearer		25
Dec. 30.	Minister of Finance, Ottawa, registration fee on bond		05

CR.

ESTATE OF G. APPLEWICK.

1919.			
Jan. 31.	By J. Thompson, watch and chain	$	1 50

ESTATE OF ROBERT BUNT.

1919.			
Jan. 20.	By Smith	$	17 50
Jan. 28.	Powell		40 00
Feb. 11.	Smith		17 50
Feb. 26.	Powell		20 00
Mar. 18.	Smith		17 50
Mar. 28.	Powell		20 00
April 5.	Genier, payment of Lot 16		1,750 00
April 9.	Smith		17 50
April 25.	Powell		20 00
May 6.	Smith		2 90
	Genier, unexpired insurance		12 05
	Genier, refund of water rates		6 90
May 27.	Powell		20 00
June 24.	"		20 00
July 28.	"		20 00
Aug. 30.	"		20 00
Oct. 30.	"		40 00
Nov. 28.	"		20 00
Dec. 30.	"		30 00

ESTATE OF DAISY MARY BRIANT.

1919.			
Dec. 1.	By Interest on $100 bond to December 1st, 1918	$	2 75
	Interest on $100 bond to June 1st, 1919		2 75
	Interest on $100 bond to December 1st, 1919		2 75

DR.

ESTATE OF LIONEL BOURASSA.

1919.			
Mar. 7.	To Cash retained by Hospital	$	12 30
April 1.	Cheque on Bank of Hochelaga returned unpaid		90 00
	Exchange		10
	"		25
April 3.	District Registrar		3 21
	J. R. Archibald		24 20
May 1.	Royal Inland Hospital		44 85
	J. L. Gordon		35 00
	Father Kennedy		5 00
	F. T. Cornwall		7 70
	Exchange		15
May 7.	"Telegram"		6 50

ESTATE OF ALEXANDER CONRAD.

1919.			
Jan. 2.	To Share of advertisement	$	50
Feb. 15.	F. Gavin		57
	Irving & Murphy		3 43
	F. T. Cornwall		50

ESTATE OF H. BUSH ELLIOTT.

1919.			
Jan. 3.	To Exchange	$	10

ESTATE OF GEORGE THOMAS EUNSON.

1919.			
Mar. 31.	To Express paid on personal effects	$	60
May 10.	J. R. Archibald		12 30
June 4.	Exchange		15
	F. T. Cornwall		6 02
	J. Munnus		56 00

ESTATE OF JOSEPHINE EGRESITZ.

1919.			
June 4.	To Exchange	$	05
June 11.	J. R. Archibald		24 10
	District Registrar		15 52

ESTATE OF WILLIAM M. EITE.

1919.			
Jan. 30.	To J. E. Lacey	$	5 00
Mar. 20.	Exchange		1 25
April 1.	"		65
April 28.	Road-tax deducted		4 00
May 2.	F. T. Cornwall		68 35
	Salmon Arm "Observer"		5 60
May 1.	Exchange		95
June 5.	S. M. McGuire		17 45
	S.A.F. Ex., Ltd.		7 01
	A. Lartinen		18 00
	Provincial Mental Hospital		519 22
	C. of D. of S.A.		490 60
	S.A.F. Ex., Ltd.		4 50

ESTATE OF GEORGE FLOCKHART.

1919.			
June 4.	To Exchange	$	20
June 16.	J. R. Archibald		24 35
July 2.	Exchange		20
Nov. 6.	F. T. Cornwall		12 62
	District Registrar		2 60
	"Telegram"		6 50

ESTATE OF ALEXANDER FOSTER.

1919.			
June 6.	To City of Kamloops	$	11 00
June 24.	Corporation of Burnaby		2 64

ESTATE OF ALBERT JOHNSON.

1919.			
Nov. 3.	To Exchange	$	20
Nov. 7.	F. T. Cornwall		7 86
Nov. 8.	R. H. Dwyer		75 00
	District Registrar		1 17
Nov. 19.	J. R. Archibald		15 60

ESTATE OF ANDERS JANSON.

1919.			
June 27.	To Account deducted by Hospital	$	30 70
Nov. 7.	"Telegram"		6 50

ESTATE OF ALFRED JOHNSON.

1919.			
Jan. 8.	To Share of advertisement	$	50
Mar. 3.	F. T. Cornwall		50

CR.

ESTATE OF LIONEL BOURASSA.

1919.			
Mar. 7.	By Northern Construction	$	54 15
	Bank of Hochelaga		90 00
	Cash on body retained by Hospital		12 30
April 1.	Bank of Hochelaga		90 00

ESTATE OF ALEXANDER CONRAD.

1919.			
Jan. 2.	By F. W. Gale	$	6 50

ESTATE OF GEORGE THOMAS EUNSON.

1919.			
Mar. 31.	By Dr. Scatchard	$	20 75
	Time-check, A.R.L. Co.		89 80

ESTATE OF JOSEPHINE EGRESITZ.

1919.			
April 17.	By Dwyer	$	10 91
May 12.	Imperial Bank		50 60

ESTATE OF WILLIAM M. EITE.

1919.			
Mar. 20.	By F. Coles	$	500 00
	Exchange		75
April 4.	F. Coles		700 00
April 28.	R. E. Christian		51 00
	1918 road-tax performed by Christian		4 00

ESTATE OF GEORGE FLOCKHART.

1919.			
May 22.	By Hospital	$	135 30
	C.N.R.		117 10

ESTATE OF ALBERT JOHNSON.

1919.			
Oct. 9.	By Cash on person, per Hospital	$	157 30

ESTATE OF ANDERS JANSON.

1919.			
June 27.	By R.I. Hospital	$	51 72
Oct. 9.	Prudham		9 70

ESTATE OF ALFRED JOHNSON.

1919.			
Feb. 5.	By Botta	$	7 00

DR.

ESTATE OF ROBERT KENNEDY.

1919.			
Jan. 10.	To Exchange	$ 1	20
Feb. 4.	"		90
Feb. 11.	R. H. Dwyer	75	00
	F. T. Cornwall	29	80
	District Registrar	25	91
	J. R. Archibald	30	30
Feb. 15.	Kamloops "Telegram"	6	50
	A. Journal	6	50
Mar. 1.	Exchange		15
Mar. 3.	F. T. Cornwall	7	40
Mar. 7.	W. Lang	85	00

ESTATE OF TONE LEE.

1919.			
Feb. 19.	To Johnstone & Rowlands	$ 24	40
May 13.	Kamloops Press, Ltd.	3	50
June 6.	City of Kamloops	28	66

ESTATE OF JOHN LECO OR LOYER.

1919.			
July 4.	To Accounts, 163 and $7.75, deducted by Hospital	$ 170	75
Sept. 8.	Exchange		20
Nov. 7.	F. T. Cornwall	16	40
	District Registrar	2	88
	R. H. Dwyer	35	00
	J. R. Archibald	22	25
Dec. 23.	Kamloops "Telegram"	9	00

ESTATE OF JAMES MAZZETTO.

1919.			
Feb. 13.	To Exchange	$	25
Mar. 1.	"		35
Mar. 7.	Fuoco Bros. *re* account	114	00
	J. F. Archibald, costs of letters of administration	31	15
	F. T. Cornwall, 5 per cent.	14	00
May 10.	Kamloops Press, Ltd.	6	50
Mar. 1.	District Registrar, probate duty	25	36
	Independent Undertakers, *re* account	141	00
July 2.	Exchange		30
Dec. 31.	"		10

ESTATE OF ANTON J. MELKIN.

1919.			
Feb. 13.	To C.P. Mortgage Corporation	$ 90	50

ESTATE OF CHARLES MEYERS.

1919.			
Dec. 1.	To Exchange	$	40
Dec. 2.	F. T. Cornwall	15	43
	J. R. Archibald	24	30
	District Registrar	18	39
	J. L. Gordon	75	00

ESTATE OF A. V. MATTSON.

1919.			
Oct. 2.	To Express on effects	$	50
Nov. 3.	Exchange on cheque	1	00
	Exchange on draft		25
Nov. 8.	District Registrar, probate duty	20	61
	Exchange on cheque		15
Nov. 19.	" "	1	00
	J. R. Archibald, costs of letters of administration	33	30
Dec. 1.	Exchange	1	75
Dec. 2.	F. T. Cornwall, 5 per cent. on $1,533.45	76	67
Dec. 3.	Exchange on cheque		15

ESTATE OF W. F. MILLER.

1919.			
Jan. 2.	To Share of advertisement	$ 1	25
	F. T. Cornwall	1	25

CR.

ESTATE OF ROBERT KENNEDY.

1919.			
Jan. 2.	By R.I. Hospital	$ 7	73
	C.P.R., wage cheque	25	50
	" "	26	30
Jan. 10.	Bank of Montreal	536	57
	C.P.R. wage cheque	27	86
	" "	20	05
	" "	68	13

ESTATE OF JOHN LECO OR LOYER.

1919.			
July 4.	By R.I. Hospital	$ 323	35

ESTATE OF JAMES MAZZETTO.

1919.			
Feb. 3.	By C.N.R., wages due deceased	$ 88	90
Feb. 13.	Imperial Bank of Canada, Edmonton, balance to credit of deceased	172	33
Feb. 19.	Imperial Bank of Canada, Edmonton, interest on savings account	1	29
Mar. 6.	Treasury, proceeds of amount collected by R. B. Ellis, O.A., Vancouver, $211.05, less $10.55 commission, 35 cents sundries	200	15
July 14.	Vancouver Hospital, balance on hand	14	00
July 23.	C.N.R., wages back time	192	95
Dec. 30.	Two years' interest on $200 bond	22	00
	One year's interest on $500 bond	27	50

ESTATE OF CHARLES MEYERS.

1919.			
Sept. 8.	By F. Gann	$ 2	65
Nov. 7.	Imperial Bank	306	00

ESTATE OF A. V. MATTSON.

1919.			
Oct. 2.	By Cash on person, per J. L. Gordon	$ 52	45
	C.N.R., wages due	58	00
	" "	51	10
Nov. 8.	Home Bank	738	35
	Royal Bank	16	05
	Bank of Commerce	616	03
Nov. 18.	Credit by Goldbloom to credit of O.A. account	1	47
Dec. 3.	Home Bank of Canada, balance of interest	4	70

ESTATE OF W. F. MILLER.

1919.			
Jan. 2.	By L. S. Hargraves	$ 25	00

ESTATE OF A. MAKI.

1919.			
Jan. 6.	By J. Thompson	$ 1	00

ESTATE OF ALEXANDER MCDONALD.

1919.			
Jan. 8.	By Patterson	$ 1	00

DR.

ESTATE OF THOMAS NAIRN.

1919.			
May 13.	To Kamloops Press, Ltd.	$	3 55

ESTATE OF ARTHUR CHESSEL ORCHARD.

1917.			
Oct. 1.	To Fee for C.I.	$	2 00
1919.			
Jan. 3.	Exchange		05
Jan. 4.	Kamloops Press, Ltd.		6 50
Mar. 6.	F. T. Cornwall		11 25
Oct. 30.	J. R. Archibald		5 20

ESTATE OF JOHN O'BRIEN.

1919.			
Jan. 3.	To Exchange	$	05
Jan. 8.	Share of advertisement		50
Jan. 4.	Kamloops Press, Ltd.		6 50
Feb. 4.	Exchange on draft		50
Feb. 10.	J. L. Gordon		175 00
	J. R. Archibald		51 30
	F. T. Cornwall		142 09
Feb. 17.	Taxes and interest, cheque to City of Kamloops		109 84
Mar. 1.	Exchange		1 30
Mar. 3.	F. T. Cornwall		56 65
June 9.	City of Kamloops		19 89
Nov. 3.	Exchange		55
Nov. 5.	F. T. Cornwall		22 14
	F. J. Fulton		294 00
	Mar Bing		43 75
	B. Goodwin		15 00
	J. L. Gordon		17 75
	Father LeJeune		25 00
	Imperial Bank		52 43
	R.I. Hospital		24 00
	Drs. Burris, A. and B.		40 00
	Drs. Irving & Murphy		5 00
	L. T. Blair		770 16
	T. Walters		72 37

ESTATE OF AUGUST PFETTSCHER.

1919.			
Nov. 25.	To Fee for filing letters of administration	$	50
Dec. 1.	Exchange		30
Dec. 3.	F. T. Cornwall		13 12
	J. R. Archibald		36 85
Dec. 23.	Kamloops "Telegram" ...		4 50

ESTATE OF JOSEPH PUFUNDI.

1919.			
Dec. 15.	To F. T. Cornwall	$	5 90
	Italian Consul		694 00

ESTATE OF MIKE POTOSKY.

1919.			
Jan. 3.	To Exchange	$	10
Jan. 8.	"Telegram"		6 50

ESTATE OF NICK PETROSKY.

1919.			
Jan. 3.	To Exchange	$	05
	R. H. Dwyer		50 00
Feb. 17.	F. T. Cornwall		3 30

ESTATE OF STEFANO RIZZO.

1919.			
April 9.	To Fee for copy of letters of administration	$	1 00
May 1.	Exchange		50
May 3.	F. T. Cornwall		19 65
	J. R. Archibald		26 10
	District Registrar		1 73
May 7.	R. H. Dwyer		127 00
	Father Kennedy		5 00
May 9.	Kamloops "Telegram"		6 50

ESTATE OF R. SUTTON.

1919.			
Feb. 12.	To Exchange	$	25
Mar. 3.	F. T. Cornwall		1 60
	Carroll & Co.		15 15

CR.

ESTATE OF WILLIAM NELSON OR NEILSON.

1919.			
Jan. 30.	By J. Thompson	$	50

ESTATE OF JOHN O'BRIEN.

1919.			
Jan. 8.	By Fulton, Morley & Clark	$	365 25
	F. B. Marchant		4 00
Feb. 17.	C. Erikson		475 00
Feb. 25.	Fulton		658 14
Oct. 31.	„		442 94

ESTATE OF AUGUST PFETTSCHER.

1919.			
Nov. 25.	By Imperial Bank, Chase	$	262 50

ESTATE OF JOSEPH PUFUNDI.

1919.			
Nov. 10.	By Key Jones	$	3 00

ESTATE OF NICK PETROSKY.

1919.			
Jan. 3.	By Thompson	$	1 50

ESTATE OF CHARLES W. ROSS.

1919.			
Jan. 20.	By J. Thompson	$	2 00

ESTATE OF STEFANO RIZZO.

1919.			
Mar. 18.	By Lavery	$	10 00
Mar. 20.	C.N.R.		11 70
April 9.	Bank of Montreal		60 15
April 22.	C.N.R.		108 25
April 23.	Postmaster-General		202 96

ESTATE OF R. SUTTON.

1919.			
Feb. 12.	By L. E. Brown	$	17 00

DR.

ESTATE OF FRANK SEGUIN.

1919.			
April 22.	To Express on trunk, etc.	$	1 00
May 1.	Exchange		05
June 4.	"		50
	R. H. Dwyer		123 00
	Drs. Irving & Murphy		30 00
	Royal Inland Hospital		9 50
	F. T. Cornwall		22 20
	District Registrar		3 18
June 11.	J. R. Archibald		24 10
Nov. 7.	"Telegram"		6 50

ESTATE OF WILLIAM HENRY SMITH.

1919.			
Feb. 4.	To Share of advertisement	$	50
Feb. 17.	F. T. Cornwall		50
	M.F.		4 00

ESTATE OF JOSEPH SCHEUCHER.

1919.			
April 7.	To Draft	$	15
May 1.	Exchange		10
May 19.	Express on trunk from Court, Sask.		3 68
April 3.	District Registrar		2 59
May 3.	J. R. Archibald		29 60
May 10.	Kamloops Press, Ltd.		6 50
Oct. 7.	Exchange		25

ESTATE OF GEORGE THOW.

1919.			
Nov. 3.	To Exchange	$	30
	Hospital account, deducted by W. F. Palmer		14 00
	Money loaned, deducted by W. F. Palmer		5 00
Nov. 13.	District Registrar, probate duty		52 92
Nov. 19.	J. R. Archibald, *re* costs of letters of administration		31 10
Dec. 1.	Exchange		1 10
Dec. 2.	F. T. Cornwall, 5 per cent. on $1,119		55 95
	J. L. Gordon *re* account		125 00
Dec. 3.	Drs. Irving & Murphy *re* account		55 00
Dec. 16.	R.I. Hospital *re* account		34 50
Dec. 23.	"Telegram" *re* account		9 00
Dec. 3.	Bunting, cartage on stove		3 00
Dec. 31.	Exchange		15

ESTATE OF HARRY TOMESCO.

1919.			
Jan. 3.	To Share of advertisement	$	75
Feb. 17.	F. T. Cornwall		1 55

ESTATE OF DANIEL ZAYAC.

1919.			
Mar. 3.	To F. T. Cornwall	$	1 34

CR.

ESTATE OF FRANK SEGUIN.

1919.			
April 19.	By Butch	$	43 00
May 12.	Royal Bank		401 00

ESTATE OF WILLIAM HENRY SMITH.

1919.			
Jan. 6.	By J. Thompson	$	5 00

ESTATE OF JOSEPH SCHEUCHER.

1919.			
Jan. 12.	By C.P.R.	$	11 75
April 7.	D. C. West		55 00
July 4.	Cash, 80 cents stamps, $2 in trunk		2 80
Sept. 22.	B. Johnson		90 00

ESTATE OF GEORGE THOW.

1919.			
Oct. 31.	By W. F. Palmer	$	212 95
	W. F. Palmer, wages due		28 20
	Bank of Hamilton, balance to credit of deceased		874 92
	Interest on above		3 00
Dec. 3.	D. McMillan, payment for stove		15 00
Dec. 8.	Palmer, payment for two hives		2 00
Dec. 31.	G. Genier, purchase price of horse		75 00

ESTATE OF HARRY TOMESCO.

1919.			
Jan. 3.	By F. W. Gale	$	21 00

ESTATE OF DANIEL ZAYAC.

1919.			
Jan. 6.	By Bauman	$	9 00
	Thompson		1 00
Feb. 4.	C.N.R.		4 90

F. T. CORNWALL,
Official Administrator.

COLUMBIA ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF W. STEFCHUK.

1919.			
Jan. 7.	To Geo. E. Sanborn	$	59 77
	Administration		58 56
Jan. 9.	H. G. Lockwood		52 53
Mar. 14.	Golden "Star"		6 80
Oct. 30.	Victory bonds		1,000 00

CR.

ESTATE OF W. STEFCHUK.

1919.			
Jan. 7.	By Bank of Commerce		$1,171 21

DR.

ESTATE OF CARL O. STONE.

1919.			
Jan. 22.	To Dominion Express	$	55
	Administration		16 47
Jan. 23.	James Henderson		65 00
Jan. 31.	Administration		9 70
Feb. 26.	Probate duty		17 43
	Sam Kee		11 45
	C. Troyer		10 00
	T. Frater		1 00
	Invermere Con. Co.		10 00
	E. F. W. Sellentin		4 00
	Rev. J. Grant		5 00
Mar. 6.	Solicitor's costs		54 30
Mar. 13.	Administration		9 90
Mar. 14.	Golden "Star"		6 80
April 23.	Administration		1 79
May 19.	"		5 50
Aug. 7.	"		1 40
Sept. 13.	"		35 87
Dec. 31.	Balance in Treasury		1,346 44

ESTATE OF CHAS. KITTILSON.

1919.			
Jan. 31.	To Administration	$	1 95
April 10.	Taxes		25 56
May 26.	Administration		2 75
Oct. 23.	Law-stamps		3 00
	Filing letters		50
Nov. 5.	Administration		33 98
	Victory bonds		600 00
Dec. 1.	Administration		2 75

ESTATE OF ALFRED FRANSON.

1919.			
Mar. 20.	To Administration	$	4 40
	Golden "Star"		4 08
	H. G. Lockwood		18 72

ESTATE OF ALEX. VACHON.

1919.			
April 1.	To Administration	$	2 50
April 10.	Taxes		22 32
Sept. 30.	Administration		2 50

ESTATE OF HARRY MATTHEWS.

1919.			
April 1.	To Administration	$	2 50
April 14.	Sanborn, taxes		2 34
Nov. 12.	Probate duty		3 29
Dec. 23.	Administration		10 00
Dec. 31.	H. G. Lockwood		31 60

ESTATE OF THOMAS JONES.

1919.			
May 19.	To Administration	$	30

ESTATE OF JAMES W. KESSECK.

1919.			
July 7.	To Administration	$	14 13
	G. W. Taylor		22 50
	Cemetery plot		3 00
Aug. 7.	Voucher		1 90
	Administration		25
Sept. 13.	Express on effects		6 57
Sept. 19.	Ellen Kesseck		239 23

ESTATE OF MARTIN POWELL.

1919.			
Jan. 9.	To Dominion Express	$	45
Aug. 7.	Administration		3 23
Sept. 30.	Administrator		60 92

ESTATE OF F. C. MARTIN.

1919.			
Sept. 13.	To Administration	$	7 80
Sept. 30.	"		76
Oct. 6.	Funeral expenses		150 00

1919. ESTATE OF W. R. ROBERTS.

Feb. 26. To R. E. Gordon, taxes ..... $ 1 14

1919. ESTATE OF JOHN MORRISON.

June 20. To G. E. Kyle, taxes ..... $ 58 16

1919. ESTATE OF WM. TROUTEN.

Dec. 17. To F. J. H. Thomas ..... $ 2 65

CR.

ESTATE OF CARL O. STONE.

1919.			
Jan. 17.	By E. M. Sandilands	$	329 40
Jan. 23.	Proceeds of Victory bonds		194 00
Mar. 13.	Can. Pac. Railway Co.		177 50
	" "		20 51
April 23.	" "		35 88
May 8.	C. R. Akers		10 00
May 19.	Elof Stenberg		100 00
Aug. 7.	"		28 00
Sept. 12.	Imperial Bank		717 31

ESTATE OF CHAS. KITTILSON.

1919.			
Jan. 31.	By Ole Berg	$	39 00
May 26.	Interest on bonds		55 00
Nov. 5.	Ole Berg		679 70
Dec. 1.	Interest on bonds		55 00

ESTATE OF ALFRED FRANSON.

1919.			
Mar. 20.	By Can. Pac. Railway Co.	$	88 00

ESTATE OF ALEX. VACHON.

1919.			
April 1.	By W. Hewitt, rent	$	50 00
Sept. 26.	" "		50 00

ESTATE OF HARRY MATTHEWS.

1919.			
April 1.	By H. Matthews, per E. Bell	$	50 00
Dec. 23.	Geo. Stevens, Imperial Bank		200 00

ESTATE OF THOMAS JONES.

1919.			
May 6.	By M. Cameron	$	6 00

ESTATE OF JAMES W. KESSECK.

1919.			
June 17.	By A. E. Farey	$	7 40
June 24.	Bank of Commerce		260 49
July 7.	Can. Pac. Railway Co.		2 26
	" "		12 43
Aug. 6.	Refund of poll-tax		5 00

ESTATE OF MARTIN POWELL.

1919.			
Aug. 7.	By Chief Constable	$	25 00

ESTATE OF F. C. MARTIN.

1919.			
Aug. 25.	By S. E. Junkins & Co.	$	4 65
	Dept. Interior		90 00
Aug. 26.	Imperial Bank		61 35
Sept. 22.	S. E. Junkins & Co.		10 35
	C. M. DeRidder		5 00

JOHN BULMAN,
Official Administrator.

SOUTH OKANAGAN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF RALPH BERNAL CRAWLEY.

1919.			
Oct. 15.	To Review Publishing Co., Ltd.	$	2 52
	Solicitor's costs as taxed ..		33 20
	Administrator's commission.		20 22
	E. W. Sawyer		223 70
	E. S. Crawley		41 68
	A. de Wolfe Bars		45 57
	Bank exchange		1 10
	Probate fees and duty		36 56

ESTATE OF TEIJI SATO.

1919.			
	To Summerland Supply Co., Ltd.	$	67 50
Oct. 4.	Bank exchange		65

ESTATE OF GEORGE RABY.

1919.			
Nov. 19.	To Bank exchange	$	30

ESTATE OF WILLIAM GEORGE RABY.

1919.			
Nov. 19.	To Bank exchange	$	15

CR.

ESTATE OF RALPH BERNAL CRAWLEY.

1919.			
May 10.	By C. H. Gayton, Treas., Baptist Church	$	404 50

ESTATE OF TEIJI SATO.

1919.			
Sept. 26.	By Summerland Lumber Co., Ltd.	$	82 69
Sept. 30.	Bank of Montreal		168 28
Oct. 4.	Summerland Lumber Co., Ltd.		1 88

ESTATE OF GEORGE RABY.

1919.			
Nov. 19.	By Bank of Montreal	$	129 34

ESTATE OF WILLIAM GEORGE RABY.

1919.			
Nov. 19.	By Bank of Montreal	$	49 70
Dec. 8.	T. Jackson		10 30
	Craig		118 35
Dec. 10.	„		76 00

W. C. KELLEY,
Official Administrator.

FERNIE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

CR.

ESTATE OF JOHN HUNTER.

1919.			
Dec. 31.	To Payment of mortgage	$	300 00
	Interest on mortgage		55 00
	Municipal taxes for 1918 ..		93 97
	Water rates		25 60
	Fire-insurance premiums ..		21 80
	Repairs to property		37 35
	Commission		28 82

ESTATE OF PAUL SHINGARA.

1919.			
Dec. 31.	To Fire-insurance premium ...	$	7 20
	Water rates		3 50
	Municipal taxes		127 24
	Repairs to property		85 00
	Commission		13 00

ESTATE OF JULES GABRIAN.

1919.			
Dec. 31.	To Commission	$	2 70

ESTATE OF P. V. JAMES.

1919.			
Dec. 31.	To Fire-insurance premium ...	$	81 00
	Water rates		36 95
	Municipal taxes		164 04
	Repairs to property		3 00
	Commission		15 62

ESTATE OF THOMAS L. GRIFFITHS.

1919.			
Dec. 31.	To Legal expenses	$	47 50
	Funeral expenses		109 80
	Municipal taxes		23 35
	Commission		15 00

DR.

ESTATE OF JOHN HUNTER.

1919.			
Dec. 31.	By Rents collected	$	76 50
	Purchase price, Lot 4, Bk. 19, Fernie		500 00

ESTATE OF PAUL SHINGARA.

1919.			
Dec. 31.	By Purchase price, Lot 6, Bk. 100, Fernie	$	320 00

ESTATE OF JULES GABRIAN.

1919.			
Dec. 31.	By Rents collected	$	54 00

ESTATE OF P. V. JAMES.

1919.			
Dec. 31.	By Rents collected	$	337 50

ESTATE OF THOMAS L. GRIFFITHS.

1919.			
Dec. 31.	By Sale of Lot 8, Bk. 40, Fernie	$	207 74

DR.			CR.		
ESTATE OF MICHAEL ROESER.			**ESTATE OF MICHAEL ROESER.**		
1919.			1919.		
Dec. 31. To Interest on mortgage		$ 202 50	Dec. 31. By Payments on property		$ 289 33
Legal expenses		83 56			
Commission		14 46			
ESTATE OF NICOLAI KRYWICKI.			**ESTATE OF NICOLAI KRYWICKI.**		
1919.			1919.		
Dec. 31. To Probate duty		$ 3 71	Dec. 31. By Canadian Bank of Commerce, Fernie		$ 354 25
Legal expenses		43 51	Old National Bank, Spokane, Wash.		52 52
Advertising		3 00			
Commission		20 33			
ESTATE OF C. JEROME.					
1919.					
Dec. 31. To Funeral expenses		$ 136 05			
ESTATE OF MARIE FALIP.			**ESTATE OF MARIE FALIP.**		
1919.			1919.		
Dec. 31. To Legal expenses		$ 59 25	Dec. 31. By P.O. Savings Bank		$ 792 59
Advertising		3 00	Rents collected		39 00
Municipal taxes		74 03			
Water rates		9 15			
Allowance to guardian		24 00			
Payments to creditors		17 50			
Gravestone		136 44			
Commission		41 57			
ESTATE OF JAMES RIVERO.			**ESTATE OF JAMES RIVERO.**		
1919.			1919.		
Dec. 31. To Legal expenses		$ 66 88	Dec. 31. By Daly Bank & Trust Company, Anaconda, Mont.		$ 267 70
Taxes		10 15	Proceeds of estate in U.S.A.		452 00
Advertising		3 00	Interest on War bonds		43 98
Commission		37 21			
ESTATE OF DANIEL ROY WILSON.			**ESTATE OF DANIEL ROY WILSON.**		
1919.			1919.		
Dec. 31. To Probate duty		$ 18 81	Dec. 31. By Home Bank of Canada		$ 642 15
Legal expenses		44 46	Canadian Bank of Commerce		36 55
Advertising		3 00			
Paid creditors		63 55			
Commission		83 93			
Paid to heir		661 18			
ESTATE OF ALEX. CASSETTI.					
1919.					
Dec. 31. To Legal expenses		$ 29 30			
Advertising		3 00			
Creditors		200 00			
ESTATE OF JOSEPH PROC.					
1919.					
Dec. 31. To Legal expenses		$ 28 30			
Advertising		3 00			
Creditors		37 50			
ESTATE OF MARINO GRIS.			**ESTATE OF MARINO GRIS.**		
1919.			1919.		
Dec. 31. To Legal expenses		$ 216 40	Dec. 31. By Cash on body		$ 10 00
Funeral and medical expenses, etc.		274 95	Canadian Bank of Commerce		404 98
Advertising		3 00	P.O. Savings Bank		2,844 25
Copy of letters of administration		1 00			
Commission		165 88			
ESTATE OF WILLIAM DUNN.			**ESTATE OF WILLIAM DUNN.**		
1919.			1919.		
Dec. 31. To Taxes on real estate		$ 9 31	Dec. 31. By Rents collected		$ 6 10
Payments to heirs		370 00			
ESTATE OF CONRAD ALENIUS.					
1919.					
Dec. 31. To Payments to heirs		$ 23 36			
ESTATE OF M. SORKIE.					
1919.					
Dec. 31. To Payments to heirs		$ 214 01			
ESTATE OF R. BAFANO.					
1919.					
Dec. 31. To Payments to heirs		$ 87 79			
ESTATE OF IVAN OR JOHN KLIMUK.					
1919.					
Dec. 31. To Interpreter for services		$ 3 00			
ESTATE OF JOHN URBAN.					
1919.					
Dec. 31. To Rev. Father Michel, funeral service		$ 10 00			
Joseph Aiello		17 25			
(Mrs.) J. Filek		30 00			

DR.

ESTATE OF HARMAN WACLAW.

1919.		
Dec. 31. To Legal expenses	$	28 30
Advertising		3 00
Interpreter for services		3 00

ESTATE OF PASQUALE BASILE.

1919.		
Dec. 31. To Legal expenses	$	27 30
Advertising		3 00
Funeral expenses		115 00
Sundry creditors		47 00
Payments to heirs		48 76

ESTATE OF PETE PASCUTTO OR PASQUTTO.

1919.		
Dec. 31. To Legal expenses	$	20 95
Advertising		3 00

ESTATE OF PIETRO MORETTI.

1919.		
Dec. 31. To Funeral and medical expenses, etc.	$	207 10
Legal expenses		29 30
Advertising		3 00
Certified copy, letters of administration		1 00
Commission		32 80
Payments to heirs		1.169 53

ESTATE OF WASYL IVANUSIK.

1919.		
Dec. 31. To Legal expenses	$	29 70
Advertising		3 00
Interpreter for services		3 00

ESTATE OF GIACOMA CANZIONO.

1919.		
Dec. 31. To Funeral expenses	$	115 00
Legal expenses		28 30
Advertising		3 00
John George		6 00

ESTATE OF SILVIO BAGLIO.

1919.		
Dec. 31. To Legal expenses	$	57 75
Guardian of children		200 00
Commission		53 44
Advertising		3 00

ESTATE OF ANTONIO WALUSKY.

1919.		
Dec. 31. To J. G. Saad	$	7 80

ESTATE OF UMBADO DAMETTO.

1919.		
Dec. 31. To D. Martinello, board account	$	56 00
Commission		3 65

ESTATE OF SEVERINE BROWN.

1919.		
Dec. 31. To Legal expenses	$	38 95
Probate duty		16 72
Commission		41 75

ESTATE OF ALLAN BRYAN.

1919.		
Dec. 31. To Commission	$	1 20

ESTATE OF MIKE OR NICK CHERNOVSKY.

1919.		
Dec. 31. To Commission	$	3 59

ESTATE OF R. S. OR S. R. FORSBERG.

1919.		
Dec. 31. To Express on effects	$	40
Commission		7 74

ESTATE OF PETE HUYAM.

1919.		
Dec. 31. To Commission	$	7 46

ESTATE OF WASIL KURLOWICH.

1919.		
Dec. 31. To Funeral expenses	$	15 00
Commission		3 05

ESTATE OF JOSEPH KOSCUIK.

1919.		
Dec. 31. To Commission	$	1 76

CR.

ESTATE OF PASQUALE BASILE.

1919.		
Dec. 31. By G.N.R. Co., wages	$	3 85

ESTATE OF PIETRO MORETTI.

1919.		
Dec. 31. By P.O. Savings Bank	$	456 40
C.P.R., wages and allowances		199 89

ESTATE OF SILVIO BAGLIO.

1919.		
Dec. 31. By Proceeds sale of real estate	$	400 00
P.O. Savings Bank		668 81

ESTATE OF UMBADO DAMETTO.

1919.		
Dec. 31. By Crow's Nest Pass Coal Co., Ltd., wages	$	73 15

ESTATE OF SEVERINE BROWN.

1919.		
Dec. 31. By C.P.R., due on contract	$	835 12

ESTATE OF ALLAN BRYAN.

1919.		
Dec. 31. By B.C. Government, wages	$	24 09

ESTATE OF MIKE OR NICK CHERNOVSKY.

1919.		
Dec. 31. By Cash found on person	$	19 85
C.P.R., wages		52 10

ESTATE OF R. S. OR S. R. FORSBERG.

1919.		
Dec. 31. By C.P.R., wages	$	137 48
Sale of effects		17 50

ESTATE OF PETE HUYAM.

1919.		
Dec. 31. By C.P.R., due on contract	$	149 37

ESTATE OF WASIL KURLOWICH.

1919.		
Dec. 31. By Cash found on person	$	61 00

ESTATE OF JOSEPH KOSCUIK.

1919.		
Dec. 31. By C.N.P. Coal Co., wages	$	35 20

DR.

ESTATE OF ALBERT LIZAK.

1919.		
Dec. 31.	To Commission	$ 2 66

ESTATE OF MARIO OLIVA.

1919.		
Dec. 31.	To Legal expenses	$ 33 35
	Albert Oliva	300 00
	Commission	81 54

ESTATE OF NICK SLEMKO.

1919.		
Dec. 31.	To Probate duty	$ 2 40
	Letters of administration	2 10
	Certified copy of letters of administration	1 00
	Funeral expenses	42 48
	Commission	2 52

ESTATE OF EVAN EVANS.

1919.		
Dec. 31.	To Commission	$ 92

CR.

ESTATE OF ALBERT LIZAK.

1919.		
Dec. 31.	By East Kootenay Lumber Co., Ltd., wages	$ 53 35

ESTATE OF MARIO OLIVA.

1919.		
Dec. 31.	By Canadian Bank of Commerce	$ 310 88
	P.O. Savings Bank	1,319 94

ESTATE OF MARK POSKITT.

1919.		
Dec. 31.	By Cash on person	$ 84 30
	T. Eaton Co., Winnipeg	2 50

ESTATE OF NICK SLEMKO.

1919.		
Dec. 31.	By C.P.R., wages	$ 50 50

ESTATE OF EVAN EVANS.

1919.		
Dec. 31.	By Sale of effects	$ 18 50

G. G. MOFFATT,
Official Administrator.

COUNTY OF NANAIMO.

(EXCEPTING THEREFROM THE ELECTORAL DISTRICT OF COMOX.)

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ROBERT PINKERTON.

1919.		
Feb. 22.	To Official Administrator	$ 6 10
	Mrs. M. Thompson	116 40
Aug. 25.	Official Administrator	10 18
	B.C. Telegraph	1 30
Oct. 14.	Official Administrator	1 25
	Mrs. M. Thompson	23 75
Nov. 13.	Official Administrator	1 25
	Mrs. Thompson	23 75
Dec. 12.	Official Administrator	1 25
	Mrs. Thompson	23 75

ESTATE OF WILLIAM THOMPSON.

1919.		
Mar. 12.	To Assessor and Collector, 1918 and 1919 taxes, part of Lot 32	$ 13 91
Oct. 7.	Official Administrator	1 45
Dec. 9.	City Clerk, Alberni, taxes to Dec. 31st, 1919, Lots 26, 27, Bk. 24, D.L. 13; Lot 1, Bk. 8, D.L. 12	17 50

ESTATE OF ROBERT RAEBURN.

1919.		
Sept. 8.	To E. H. Tucker, 1918 and 1919 taxes, Lots 8, 9, Edson	$ 5 09

ESTATE OF ROBERT WALKINSHAW.

1919.		
Nov. 12.	To Official Administrator	$ 40 00
	J. Stewart, commission and drawing release of mortgage	46 00
	Wm. Stone Marshall, release of mortgage C.B. 28, Lot 371, Nos. 221, 429	250 00
Dec. 15.	Yarwood & Harrison	7 00

ESTATE OF PIETRO FORNER.

1919.		
Sept. 13.	To R. W. Ellis as per power of attorney	$ 637 00

CR.

ESTATE OF ROBERT PINKERTON.

1919.		
Feb. 22.	By Remittance to Treasury	$ 122 50
Aug. 14.	Yates & Jay, proceeds of mortgage	2,203 06
Oct. 14.	Remitted to Treasury	25 00
Nov. 13.	" "	25 00
Dec. 12.	" "	25 00

ESTATE OF WILLIAM THOMPSON.

1919.		
Oct. 7.	By Proceeds of coupons, 4 to 11, City of Alberni debentures	$ 29 00

ESTATE OF ROBERT WALKINSHAW.

1919.		
Nov. 12.	By J. Stewart, sale of Lot 4, Bk. 92, Ladysmith	$ 800 00

ESTATE OF PIETRO FORNER.

1919.		
July 31.	By E. M. Yarwood	$ 637 00

DR.

ESTATE OF CHARLES J. HEWSON.

1919.			
Feb. 12.	To Official Administrator	$	2 50
July 29.	Corporation of City of Prince Rupert, 1918 taxes		14 65
Aug. 15.	Registrar, certified copy of Judge's order		1 00
	Corporation of the City of Prince Rupert, 1919 taxes		15 40
Aug. 18.	Travelling expenses, Official Administrator, *re* sale of Lot 9, Bk. 75, D.L. 301 ..		5 95
Aug. 21.	Official Administrator		40 00
Aug. 22.	Dow-Fraser Trust Co., rent of safety-deposit box		4 50
	Corporation of City of Vancouver, 1919 taxes, Lot 10, Bk. 2, D.L. 23		6 60
Aug. 28.	Official Administrator		1 00
Sept. 16.	A. Leighton		2 50
Sept. 20.	H. T. Devine & Co., proportion of 1919 taxes on Lot 19, Bk. 75, D.L. 301		31 15
Oct. 14.	Mrs. Mellor, allowance for wiring house		5 00

ESTATE OF HENRY BIGGS.

1919.			
Feb. 27.	To J. C. Biggs, legal heir, ⅛ of $504.80	$	63 10
April 28.	Official Administrator		26 08
June 10.	Catherine J. Biggs, ⅛ of $1,000.44		333 48
	J. C. Biggs, ⅛ of $666.96 (less $63.10)		20 27
	Assessor and Collector, 1918 taxes		82 40
June 16.	Harry Eugene Biggs, ⅛ of $666.96		83 37
Aug. 14.	Hershall Rheuben James Biggs, ⅛ of $666.96		83 37
Oct. 17.	Thomas Morris Biggs, ⅛ of $666.96		83 37
Oct. 24.	W. R. Biggs, ⅛ of $666.96		83 37

ESTATE OF ELIZABETH LEAS.

1919.			
Feb. 12.	To Mrs. Wallace Merrow, legal heir, ¼	$	186 97
	May L. Leas, legal heir, ¼		186 97
	Geo. E. Leas, legal heir, ¼		186 97
April 28.	Official Administrator		26 08

ESTATE OF CHARLES WEIRICH.

1919.			
Feb. 12.	To C. H. B. Potts	$	13 10
Mar. 10.	Official Administrator		73 29

ESTATE OF MRS. SARAH KENYON.

1919.			
Sept. 16.	To A. Leighton	$	2 50

ESTATE OF GEORGE COMPTON.

1919.			
Mar. 12.	To Assessor and Collector, Alberni, 1919 taxes	$	17 91

ESTATE OF ISAAC G. WHITCOME.

1919.			
Mar. 12.	To Assessor and Collector, Nanaimo, taxes	$	23 71
July 24.	Assessor and Collector, Nanaimo, taxes		5 63

ESTATE OF HJALMAR NYBERG.

1919.			
Feb. 12.	To Registrar, Nanaimo, probate duty	$	12 85
May 14.	Government Agent, for law-stamps		2 60

ESTATE OF EMILO TUSSA.

1919.			
Oct. 25.	To Royal Consul-General for Italy, Montreal	$	849 20

CR.

ESTATE OF CHARLES J. HEWSON.

1919.			
Jan. 14.	By Rent, Mrs. Mellor	$	13 00
Feb. 12.	„ „		10 00
April 28.	„ „		20 00
June 6.	„ „		20 00
Aug. 21.	Mrs. D. Cook, sale of Lot 19, Bk. 75, D.L. 301		800 00
Aug. 28.	Mrs. Mellor, rent		20 00

ESTATE OF HENRY BIGGS.

1919.			
April 28.	By Leighton, Ross & Elder, *re* John Biggs Estate	$	521 72

ESTATE OF ELIZABETH LEAS.

1919.			
April 28.	By Leighton, Ross & Elder, *re* John Biggs Estate	$	521 72

ESTATE OF CHARLES WEIRICH.

1919.			
Mar. 8.	By John Gold, principal	$	50 00
	John Gold, interest on $300 to March 1st, 1919		7 50
	S. Melzer		22 00
	„		322 00
	J. Gold		62 50
	S. Melzer		16 00
	„		216 00
	H. Gibson		770 00

ESTATE OF EMILO TUSSA.

1919.			
Jan. 11.	By Remittance to Treasury ...	$	1 00

DR.

ESTATE OF ANTONIO TUSSA.

1919.			
Aug. 27.	To Treasurer, Town of Edson, taxes	$	4 44
Oct. 8.	Official Administrator		6 50
	Secretary, Town of Tofield, taxes		17 75
Oct. 24.	Royal Consul-General for Italy, Montreal		765 13

ESTATE OF BILL MAISURADZE.

1919.			
Feb. 12.	To Yarwood & Harrison	$	34 10

ESTATE OF EVA JENKINS (SOMETIMES KNOWN AS EVA KIRK).

1919.			
Jan. 13.	To H. McAdie, funeral expenses	$	200 00
Jan. 14.	Official Administrator		5 00
Jan. 23.	Registrar-General, Victoria, certificate of encumbrances		1 00
Feb. 12.	Nanaimo "Free Press"		2 30
Feb. 14.	Official Administrator		5 00
Feb. 19.	James Marshall		30 00
	Registrar, Nanaimo, probate duty		1 39
Mar. 7.	Official Administrator, sale of Lot 4, Bk. 42		100 00
Mar. 17.	City Taxi Cab Co.		1 50
April 28.	Official Administrator		9 05
	J. H. Good & Co.		62 60
May 27.	Official Administrator		10 17
June 6.	James Marshall		6 00
	Corporation of the City of Nanaimo, taxes and interest		88 90
June 28.	Yarwood & Harrison		52 72
	Caroline Miller Morton, balance of estate, legal heir		1,403 77

ESTATE OF WILLIAM SCOTT SMITH.

1919.			
Jan. 25.	To Mrs. B. E. Encell	$	55 00
Jan. 12.	Canadian Bank of Commerce		3 60
Feb. 17.	Official Administrator		200 29

ESTATE OF SADIE WEARE.

1919.			
Feb. 11.	To Mrs. F. W. Woollett	$	30 00
June 4.	„ „		30 00
June 5.	„ „		40 00
	Militia and Defence, Ottawa, repayment of cheque 61794		45 00
	Yarwood & Harrison		16 70
Sept. 19.	Mrs. F. W. Woollett		60 00
Nov. 1.	„ „		20 00

ESTATE OF LOUIS JOHNSON.

1919.			
Jan. 14.	To Port Alberni "News"	$	2 76
Jan. 17.	Registrar, probate duty		3 92
Feb. 19.	West Coast General Hospital		9 00
	Government Agent, law-stamps		1 00

ESTATE OF LOUIS LARANGE.

1919.			
Jan. 14.	To Port Alberni "News"	$	2 76
Jan. 17.	Registrar, probate duty		2 73
	Official Administrator		4 21
	George Forrest, funeral expenses		74 50
	J. R. Edwards		50

ESTATE OF EMIL RANTENNIN.

1919.			
Feb. 19.	To Ladysmith General Hospital	$	12 50
Sept. 17.	R. McCallum, taxes		29 70
Oct. 3.	„ „		10 53

ESTATE OF VUNANELLO GIACOMO.

1919.			
Jan. 31.	To Official Administrator	$	7 56
	Government Agent, law-stamps		1 00
June 28.	Royal Italian Consul, Montreal, for legal heirs		245 31

ESTATE OF ALEXANDER JOHNSTON.

1919.			
Jan. 18.	To Official Administrator	$	52 50
Feb. 19.	Catherine Johnston and Wm. Rigg, trustees		997 50

CR.

ESTATE OF ANTONIO TUSSA.

1919.			
Oct. 8.	By Angelo Belzano	$	130 00

ESTATE OF EVA JENKINS (SOMETIMES KNOWN AS EVA KIRK).

1919.			
Jan. 14.	By Ester Brown	$	100 00
Feb. 14.	„		100 00
Feb. 28.	A. E. Planta, sale of Lot 4, Bk. 42		1,000 00
April 28.	Sale of old furniture		181 05
May 27.	Proceeds of insurance policy, Metropolitan Life		203 40

ESTATE OF WILLIAM SCOTT SMITH.

1919.			
Feb. 17.	By Proceeds, sale of bonds	$	4,005 81

ESTATE OF SADIE WEARE.

1919.			
June 28.	By Repayment of commission, November military cheque	$	2 25

ESTATE OF LOUIS LARANGE.

1919.			
Feb. 11.	By Workmen's Compensation Board	$	84 38

ESTATE OF VUNANELLO GIACOMO.

1919.			
Jan. 31.	By Remittance to Treasury	$	151 38

ESTATE OF ALEXANDER JOHNSTON.

1919.			
Jan. 18.	By Leighton, Ross & Elder	$	1,050 00

DR.

ESTATE OF PAUL KOZAK.

1919.			
Feb. 25.	To Official Administrator	$ 22	38
Mar. 12.	A. Schofield, freight and cartage on effects, Port Alberni to Nanaimo	2	39
May 14.	Government Agent, law-stamps	2	60
Oct. 2.	Port Alberni "News"	4	60

ESTATE OF NORMAN STANLEY CUTHBERTSON.

1919.			
Mar. 12.	To Official Administrator	$ 70	00
	Herald Printing and Publishing Co., advertising Judge's order	5	40
	Herald Printing and Pub. lishing Co., advertising for tenders	3	00
May 15.	Registrar, certified copy of Judge's order	1	00
May 19.	Barnard, Robertson, Heisterman & Tait	59	45
May 27.	B.C. Telephone Co., long-distance to Parksville		30
	Assessor and Collector, taxes 1916, 1917, and 1918	47	71
Nov. 15.	Barnard, Robertson, Heisterman & Tait	100	00
Dec. 6.	Barnard, Robertson, Heisterman & Tait	15	10

ESTATE OF ESTHEL GERVAIS.

1919.			
Mar. 20.	To Official Administrator	$ 3	23
	Government Agent, law-stamps	2	60
	Herald P. & P. Co.	2	40
Mar. 22.	McAdie Undertaking Co., balance of funeral expenses	34	00
Sept. 16.	Nanaimo Hospital	8	60

ESTATE OF ERNEST HOSKINS SOADY.

1919.			
June 5.	To Registrar, certified copy of Judge's order	$ 1	00
	Official Administrator	8	46
	D. J. Jenkins, funeral expenses	101	50
	City Taxi Cab Co., car to Cassidy's	5	00
	W. A. Selby, auto-hire for J. Russell	3	00
June 10.	Yarwood & Harrison	6	20
	Official Administrator	8	37

ESTATE OF EDWARD FIELDING.

1919.			
June 5.	To Official Administrator	$ 17	50
June 10.	McAdie Undertaking Co., funeral expenses	143	00
June 12.	Yarwood & Harrison	14	15
	P. Hodgson	71	00
Dec. 3.	Nanaimo "Free Press"	2	20
	Henry W. R. McAdie, funeral expenses, Eliz. Fielding, as per S.C.O.	102	15

ESTATE OF WILLIAM MARSHALL.

1919.			
Nov. 5.	To Official Administrator	$ 20	50
	Registrar, law-stamps		20
	Registrar, Treasury forms	2	90
	Registrar, probate duty	15	43
Nov. 19.	R. E. McMinn, express charges and telegram	1	40
Nov. 26.	Geo. Forrest, funeral expenses	86	00
Dec. 30.	Port Alberni "News"	3	00

ESTATE OF ALBERT ELMGREN.

1919.			
Nov. 26.	To Official Administrator	$ 10	70
	A. Forrester, District Registrar	3	50
	A. Forrester, probate duty		13
	McAdie Undertaking Co.	199	72

ESTATE OF JOHN DOHERTY.

1919.			
Nov. 27.	To Official Administrator	$ 6	35
Dec. 27.	A. Leighton	8	00

CR.

ESTATE OF PAUL KOZAK.

1919.			
Feb. 25.	By Police	$ 17	50
	Workmen's Comp. Board	9	08
	Pay-cheques	421	10

ESTATE OF NORMAN STANLEY CUTHBERTSON.

1919.			
Mar. 12.	By Mrs. A. V. Jenkyn, sale of property	1,400	00

ESTATE OF ESTHEL GERVAIS.

1919.			
Mar. 20.	By Chief of Police	$ 64	73

ESTATE OF ERNEST HOSKINS SOADY.

1919.			
June 5.	By Canadian Bank of Commerce	$ 169	39
June 12.	United B. of C. and Joiners	139	50
June 14.	Granby Con. M. S. & P. Co.	28	30

ESTATE OF EDWARD FIELDING.

1919.			
June 5.	By E. M. Yarwood, sale of Lot 1, Bk. 8, South Wellington	$ 350	00

ESTATE OF WILLIAM MARSHALL.

1919.			
Nov. 5.	By Royal Bank of Canada	$ 410	50

ESTATE OF ALBERT ELMGREN.

1919.			
Nov. 26.	By Canadian Bank of Commerce	$ 89	75
	Granby Co.	109	00
	Cash	15	30

ESTATE OF JOHN DOHERTY.

1919.			
Nov. 26.	By District Registrar	$ 127	10

DR.

ESTATE OF JOSEPH FILEPICH.

1919.			
Nov. 27.	To Official Administrator	$	3 00

ESTATE OF NICK KURETICH.

1919.			
Nov. 27.	To Official Administrator	$	4 88

CR.

ESTATE OF JOSEPH FILEPICH.

1919.			
Nov. 27.	By Pacific Coast Coal Mines, Ltd.	$	60 00

ESTATE OF NICK KURETICH.

1919.			
Nov. 27.	By Chief of Police, Ladysmith, wages	$	97 73

S. McB. SMITH,
Official Administrator.

REVELSTOKE ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF GEO. S. ADAMS.

1919.			
Jan. 9.	To A. Johnson	$	3 85
Feb. 24.	Grace Adams		150 00
June 17.	N. R. Brown		8 95
Aug. 28.	J. A. Stewart		43 75
Dec. 2.	Esther Adams		150 00
	Ruth Adams		150 00
	A. Johnson		3 12

ESTATE OF GUS E. ANDERSON.

1919.			
Jan. 9.	To C. R. Macdonald	$	2 00
	Review Publishing Co.		6 00
	Drs. Sutherland & Hamilton		75 00
	L. A. Howson		75 00
	Probate duty		66 87
	W. I. Briggs		36 80
	Jas. Hathaway		25 00
	A. Johnson		18 35
Feb. 24.	Revelstoke Hospital		5 15
June 17.	N. R. Brown		6 55
July 30.	A. Johnson		1 25
Dec. 6.	„		2 50

ESTATE OF PETER JOHN AUGUSTSON.

1919.			
May 28.	To A. Johnson	$	119 35
	W. I. Briggs		46 05
	Review Publishing Co.		6 40
	L. A. Howson		46 50
June 9.	District Registrar, Supreme Court		374 90
	City Transfer Co.		1 50
June 20.	Geo. E. Kyle		64 68

ESTATE OF B. BATEMAN.

1919.			
Mar. 12.	To S. Bateman	$	225 74

ESTATE OF JAMES MARTIN BROPHY.

1919.			
Jan. 9.	To Law-stamps	$	1 00

ESTATE OF JOHN CHORNEY.

1919.			
Jan. 9.	To Review Publishing Co.	$	6 00
	Sutherland & Hamilton		75 00
	W. I. Briggs		31 80
	Registrar, County Court ...		7 74
	Rev. Father MacKenzie ...		15 00
	L. A. Howson		86 50
	A. Johnson		75 40

ESTATE OF SANTA COLLIA.

1919.			
Sept. 10.	To A. Johnson	$	5 00
	W. F. Hansford		7 50
Dec. 2.	A. Johnson		1 50
	L. A. Howson		69 50

CR.

ESTATE OF GEO. S. ADAMS.

1919.			
Dec. 31.	By Cash	$	139 50

ESTATE OF GUS E. ANDERSON.

1919.			
Dec. 31.	By Cash	$	628 70

ESTATE OF PETER JOHN AUGUSTSON.

1919.			
Dec. 31.	By Cash	$	2,386 93

ESTATE OF JOHN CHORNEY.

1919.			
Dec. 31.	By Cash	$	1,508 46

ESTATE OF SANTA COLLIA.

1919.			
Dec. 31.	By Cash	$	130 00

DR.

ESTATE OF THOMAS GILLESPIE.

1919.			
Feb. 24.	To Thos. Steed	$	4 00
	Revelstoke Hospital		4 75
	A. Johnson		65 89
	Registrar, County Court		23 00
	Cochrane & Ladner		18 25
	W. I. Briggs		30 70
	L. A. Howson		165 00
	Review Publishing Co.		13 40
	City Transfer Co.		2 00
	A. Cowie		37 80
Mar. 12.	J. A. Stone		135 50
July 30.	A. Johnson		13 10
Dec. 6.	"		4 50
Dec. 12.	W. I. Briggs		15 00

ESTATE OF THOMAS GODE.

1919.			
Feb. 24.	To Registrar, County Court	$	6 96
	A. Johnson		9 71
	W. I. Briggs		29 80
	Mrs. W. Kinnee		20 00
	C. R. Macdonald		4 75
	Rosse & Drage		1 00
	Review Publishing Co.		6 00
	McKinnon & Sutherland		6 75
	L. A. Howson		68 50
	B. C. Freeman		5 00
	John McIntyre		1 50
	John Simpson		15 00

ESTATE OF FONG FOW JONG.

1919.			
May 28.	To Wing Chung	$	51 14
	W. I. Briggs		7 20
	A. Johnson		3 25
	Registrar, County Court		3 24

ESTATE OF HUM KONG KEE.

1919.			
May 28.	To Wing Chung	$	54 03
	W. I. Briggs		7 20
	A. Johnson		3 40
	Registrar, County Court		3 40

ESTATE OF REBECCA HARVEY.

1919.			
Jan. 9.	To Kootenay Agencies, Ltd.	$	8 50
Feb. 24.	S. Needham		11 25
May 28.	A. Johnson		1 50
July 30.	S. Needham		107 15
Sept. 10.	A. Johnson		3 00
Dec. 6.	"		1 00

ESTATE OF TOMI HASHIMOTO.

1919.			
Jan. 9.	To Drs. Sutherland & Hamilton	$	50 00
	W. I. Briggs		28 20
	C. H. Leon		2 70
	City of Revelstoke		7 05
	A. Johnson		12 25
Feb. 24.	Registrar, County Court		12 23
Mar. 12.	C. H. Leon		3 00
Dec. 2.	Review Publishing Co.		3 00
Dec. 12.	W. I. Briggs		16 85

ESTATE OF THOMAS HORNE.

1919.			
Aug. 29.	To A. McQueen	$	37 50

ESTATE OF R. L. MCCONVILLE.

1919.			
Dec. 6.	To A. Johnson	$	72 62
	L. A. Howson		290 50
	W. I. Briggs		30 90
	Registrar, County Court		11 62

ESTATE OF THOMAS MCMAHON.

1919.			
Jan. 4.	To City of Vancouver	$	134 67

ESTATE OF JOHN NICHOL.

1919.			
Dec. 2.	To Mrs. G. H. Howieson	$	50 00

ESTATE OF MATSUSHIRO TANAKA.

1919.			
Jan. 9.	To Review Publishing Co.	$	6 00
	Registrar, County Court		9 86
	A. Johnson		9 87
	W. I. Briggs		29 80
	Y. Takizawa		141 93

CR.

ESTATE OF THOMAS GILLESPIE.

1919.			
Dec. 31.	By Cash	$	1,669 86

ESTATE OF THOMAS GODE.

1919.			
Dec. 31.	By Cash	$	194 39

ESTATE OF FONG FOW JONG.

1919.			
Dec. 31.	By Cash	$	64 83

ESTATE OF HUM KONG KEE.

1919.			
Dec. 31.	By Cash	$	68 03

ESTATE OF REBECCA HARVEY.

1919.			
Dec. 31.	By Cash	$	110 00

ESTATE OF TOMI HASHIMOTO.

1919.			
Dec. 31.	By Cash	$	244 68

ESTATE OF R. L. MCCONVILLE.

1919.			
Dec. 31.	By Cash	$	1,452 49

ESTATE OF MATSUSHIRO TANAKA.

1919.			
Dec. 31.	By Cash	$	197 46

DR. ESTATE OF JUNG YUEN.

1919.			
Dec. 2.	To W. I. Briggs	$	7 50
	A. Johnson		4 85
	Wing Wo		84 80

CR. ESTATE OF JUNG YUEN.

1919.			
Dec. 31.	By Cash	$	97 15

ARTHUR JOHNSON,
Official Administrator.

COUNTY COURT, DISTRICT OF NEW WESTMINSTER.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR. ESTATE OF COLIN ASHER.

1919.			
Mar. 25.	To Copies of letters	$	2 00
April 3.	F.V. "Record," advertising		3 00
	Cooper, Mission, funeral, etc.		56 00
	C. G. Major, commission		23 47
April 10.	E. W. Begeloe, legal		50 00
Nov. 3.	Alex. Asher, heir		334 98

ESTATE OF CHARLES BONE.

1919.			
Feb. 3.	To Whiteside, Edmonds & Whiteside	$	65 90
Sept. 3.	Copies of letters of administration		1 00

ESTATE OF WILLIAM BROWN.

1919.			
Aug. 4.	To Exchange on cheque	$	50
Aug. 18.	Auctioneer's commission		267 75
	Auction adv., "Columbian"		12 80
	Auction adv., "Province"		8 40
	Exchange on cheques		2 05
Sept. 2.	D. S. Brown, wages advanced		324 09
	D. Murchie & Son, funeral		121 00
	Surrey 1919 taxes		96 00
Sept. 19.	W. J. McNally, wages		75 50
	Gee Chop Hing, wages		80 50
Oct. 10.	C. G. Major		2,304 40
Nov. 13.	Bonds, Jas. L. Brown, M.D.		6,000 00
	Bonds, Annie Brown		6,000 00
	Bonds, David S. Brown		6,000 00
Nov. 24.	Bank, transfer registered bonds		1 25
Dec. 2.	Whiteside, Edmonds & Whiteside		100 00
Dec. 8.	"Columbian"		8 10
Dec. 10.	C. G. Major, telegram		4 00
	H. Shepherd, feed		3 85
Dec. 29.	C. G. Major		1,675 25
	Rev. D. S. Brown, brother		2,374 22
	Dr. J. L. Brown, brother		2,374 21
	Annie Brown, sister		1,374 21

ESTATE OF JOHN CARVER.

1919.			
July 24.	To 1919 tax, Lot 5, Burnaby	$	8 40

ESTATE OF MARTHA CAMERON.

1919.			
Mar. 12.	To C. G. Major	$	7 36

ESTATE OF GEORGE COOPER.

1919.			
Jan. 9.	To "Columbian," advertising	$	8 64

ESTATE OF BYON D. CLAUSE.

1919.			
Jan. 20.	To Letter of administration	$	1 00
Feb. 3.	Royal Columbian Hospital		2 00
	C. G. Major, commissioon		7 69
	D. Murchie & Son		45 00
	"Columbian"		4 32
	F. A. Marshall		5 00
	Corbould & Grant, legal		30 84

ESTATE OF DENNIS CURTIN.

1919.			
June 11.	To Telegrams	$	5 20

CR. ESTATE OF COLIN ASHER.

1919.			
Mar. 25.	By Cash on person	$	169 97
Mar. 28.	Bank of Montreal		299 48

ESTATE OF CHARLES BONE.

1919.			
Sept. 3.	By Mearns, principal	$	864 00
Nov. 14.	Mearns, mortgage		500 00

ESTATE OF WILLIAM BROWN.

1919.			
Aug. 4.	By Sale of hogs	$	401 00
	Cash in house		1 68
Aug. 18.	Proceeds from auction		6,636 35
Oct. 10.	Canadian Bank of Commerce		360 19
	Bank of Toronto		1,049 89
Oct. 14.	Bank of Montreal		958 22
Oct. 17.	Refund, copies letters of administration		3 00
Nov. 12.	Land-sale		19,500 00
Nov. 17.	Interest on bonds		27 50
Nov. 25.	" "		15 00
	Sale of War certificates		150 50
	Interest on same		12 25
	Interest on bonds		52 50
Dec. 10.	Berry, balance on sale		40 00

ESTATE OF BYON D. CLAUSE.

1919.			
Jan. 20.	By Royal Bank	$	140 40

ESTATE OF DENNIS CURTIN.

1919.			
June 5.	By Police	$	64 05

DR.

ESTATE OF EMELIO CLEMENTIA.

1919.			
Sept. 2.	To Williams, Walsh, McKim & Housser	$	42 80
	C. G. Major, commission		15 00
	C. Domemck		110 00

ESTATE OF ALEX. L. CAMPBELL.

1919.			
Nov. 3.	To "Columbian"	$	5 40
	C. G. Major, commission		51 68
Dec. 23.	Whiteside, Edmonds & Whiteside		57 20
	Margaret J. Campbell		796 87

ESTATE OF MARIE ANGE DESPRES.

1919.			
June 25.	To 1919 taxes	$	4 79

ESTATE OF AUGUST ENSTROM.

1919.			
Jan. 11.	To "Columbian" advertising	$	3 96

ESTATE OF JOHN FRASER.

1919.			
June 22.	To 1919 taxes, Lot 1491	$	66 49
Aug. 1.	C. G. Major for 1918 taxes paid		84 09

ESTATE OF WILLIAM FRASER.

1919.			
April 3.	To J. S. Clute, legal	$	24 45
	J. S. Clute *re* quit-claim deed		12 50
	C. G. Major, commission		19 11
	"Columbian"		5 40
May 1.	Mrs. Wm. Fraser, note and interest		105 00

ESTATE OF JOHN ROSS FOORD.

1919.			
June 20.	To Land-tax, school	$	56 23

ESTATE OF HENRY GOODFELLOW.

1919.			
Jan. 15.	To Whiteside, Edmonds & Whiteside	$	34 95
Jan. 22.	Exchange on cheque		1 25
Mar. 12.	Hire of auto for Official Administrator		8 00
May 1.	Whiteside, Edmonds & Whiteside, deed		26 00
	N. Clark, lumber		5 00

ESTATE OF EDWIN GARDNER.

1919.			
Nov. 7.	To "Columbian," advertising	$	5 40
Nov. 11.	Corbould & Grant, legal		38 24
Dec. 2.	Langley, taxes, 1919		2 40
Dec. 16.	Murchie, funeral		65 00

ESTATE OF GWENDA.

1919.			
April 3.	To J. S. Clute, legal	$	35 08
	C. G. Major, commission		22 77
	"Columbian"		5 04
July 15.	Copies of letters		1 00
Aug. 1.	C. G. Major, commission		31 52
	Kella, father and heir		535 18

ESTATE OF FRANK C. HOIT.

1919.			
Mar. 12.	To C. G. Major, trip to Chilliwack	$	9 30

ESTATE OF JEFFREY HAMMAR.

1919.			
Mar. 12.	To C. G. Major, trip to Chilliwack	$	4 00

ESTATE OF ALBERT JENNER.

1919.			
June 2.	To A. W. Petapiece, legal	$	30 05
	"Columbian"		3 24
	C. G. Major, commission		4 53

CR.

ESTATE OF EMELIO CLEMENTIA.

1919.			
July 31.	By Metal Workers' Lodge	$	100 00
Aug. 18.	Williams, Walsh, McKim & Housser		200 00

ESTATE OF ALEX. L. CAMPBELL.

1919.			
Oct. 9.	By Geo. James, balance principal and interest	$	412 40
Oct. 14.	Royal Bank, savings		374 62
	Royal Bank, current		246 73

ESTATE OF JOHN FRASER.

1919.			
Feb. 28.	By Land-sale	$	60 00
June 27.	1919 taxes from Cope		66 49
July 9.	Land-sale		60 00
Oct. 28.	"		60 00

ESTATE OF WILLIAM FRASER.

1919.			
Feb. 27.	By J. A. Sinclair *re* land	$	382 33

ESTATE OF HENRY GOODFELLOW.

1919.			
Jan. 22.	By N. Clark *re* land-sale	$	450 00
Mar. 22.	"		500 00
May 1.	G. E. Powell, sale of effects		45 00
Oct. 9.	Wright, principal		300 00
	Wright, interest		40 20

ESTATE OF EDWIN GARDNER.

1919.			
Sept. 30.	By Cash on person	$	74 60
	Wages, Reynolds Lumber Co.		38 20
Oct. 20.	Bank of Montreal		279 65
	Imperial Bank		128 23

ESTATE OF GWENDA.

1919.			
Mar. 21.	By Royal Bank	$	455 59
July 15.	Share of sale of property		175 00

ESTATE OF ISAAC W. GREENWOOD.

1919.			
June 5.	By Gray, principal	$	200 00
	Gray, interest to May 12th, 1919		16 00
July 7.	Remittance to Treasury		216 00
Nov. 17.	Gray, interest to Nov. 12th, 1919		8 00

1919. ESTATE OF ALBERT JENNER.

April 26.	By Merchants Bank	$	90 65

DR.

ESTATE OF EVAN JAMES.

1919.			
April 4.	To D. M. Leith, repair to watch	$	5 00

ESTATE OF HENRY F. JONES.

1919.			
Dec. 18.	To Pearl Bock	$	456 24

ESTATE OF ARVID JOHNSON.

1919.			
Mar. 15.	To Balance due on Victory bond	$	31 97
April 3.	Murchie, balance for funeral		26 00
	J. D. Kennedy, legal		43 90
	C. G. Major, commission		70 53
	"Columbian"		6 24
Aug. 1.	Consul-General for Sweden		1,232 13

ESTATE OF MINNIE WARREN KENNEDY.

1919.			
June 12.	To Copy of letters of administration	$	1 00
July 3.	J. D. Kennedy, legal		29 50
	"Columbian," advertising		3 24
Aug. 1.	Copy of letters of administration		1 00
Sept. 2.	C. G. Major, commission		22 35
	D. F. Kennedy, funeral expenses		83 50
	D. F. Kennedy, husband and heir		80 68

ESTATE OF FUKWOKA KIGIRO.

1919.			
Oct. 4.	To "Columbian"	$	3 24
	C. G. Major, commission		20 85
Nov. 14.	McQuarrie & Martin		21 50
	Nihachi Wakoshinia		371 57

ESTATE OF E. W. KING.

1919.			
Aug. 1.	To R. C. McDonald and P. Byrne	$	135 00

ESTATE OF CHRISTIAN THEODOR KEMPRUD.

1919.			
June 6.	To Copies of letters of administration (two)	$	2 00
June 11.	Advanced Helga, sister		25 00
	Probate duty		17 04
Aug. 7.	"Columbian"		5 40
	Whiteside, Edmonds & Whiteside		29 00
Sept. 11.	G. Kemprud, father, on account		100 00

ESTATE OF WILLIAM LANDERS.

1919.			
Jan. 1.	To Watchman	$	2 50

ESTATE OF JOSEPH LACROIX.

1919.			
Jan. 1.	To C. G. Major	$	1 60

ESTATE OF STEVE LAHKO.

1919.			
Jan. 2.	To Whiteside, Edmonds & Whiteside	$	15 00
Jan. 9.	D. Murchie & Son, funeral		45 00
	R.C. Hospital		12 00
	"Columbian," advertising		5 40
	Mrs. Coughlin		7 60

ESTATE OF JOHN A. LEWIS.

1919.			
Mar. 26.	To L. A. Lewis, heir, on account	$	100 00
July 11.	L. A. Lewis, heir		327 77
July 24.	Burnaby, 1919 taxes		32 40

CR.

ESTATE OF ARVID JOHNSON.

1919.			
Mar. 15.	By Royal Bank	$	608 93
	Bank of Hamilton		608 59
	Cash on person		100 00
	Sale of suit-case		3 00
Mar. 18.	J. J. Johnston, sale of bond		50 00
Mar. 20.	Smith Dollar Co., wages		40 25

ESTATE OF MINNIE WARREN KENNEDY.

1919.			
June 6.	By Canadian Bank of Commerce	$	118 27
Aug. 9.	Bank of Montreal		104 00

ESTATE OF FUKWOKA KIGIRO.

1919.			
June 21.	By Royal Bank	$	417 16

ESTATE OF E. W. KING.

1919.			
Jan. 20.	By Pellon, account land-sale	$	533 33
July 25.	Pellon, interest to Jan., 1919, and interest on interest		119 00
Nov. 7.	Pellon, balance in full *re* land-sale		1,066 67
	Interest in full		72 60

ESTATE OF CHRISTIAN THEODOR KEMPRUD.

1919.			
June 6.	By Dominion Government	$	2 59
June 11.	Sale of bond		50 00
June 18.	Bank at Athalmer		364 10
July 21.	Sale of launch		90 00

ESTATE OF C. LAMBERT.

1919.			
Mar. 3.	By Sale of gun	$	9 00

ESTATE OF WILLIAM LAING.

1919.			
May 16.	By McQuarrie & Martin	$	45 00
Aug. 1.	" "		9 00
Nov. 10.	" "		9 00

DR.

ESTATE OF THOS. ROBT. LOVE.

1919.			
Feb. 3.	To Whiteside, Edmonds & Whiteside	$	42 87
	T. P. Hall, M.D.		10 00
	G. de B. Watson, M.D.		7 00
	Miss Chalfort, nurse		30 00
	G. E. Drew, M.D.		105 00
	Murchie & Son		137 50
	D. S. Curtis		10 60
	C. G. Major, commission		71 73
	"Columbian"		22 50
	C. G. Major		1 00
	Whiteside, Edmonds & Whiteside		3 00
	Jesse Love, heir		993 47

ESTATE OF JOHN LONGO.

1919.			
Dec. 11.	To Probate duty	$	5 88
	Three copies of letters of administration		3 00

ESTATE OF HEWEN MIDDLETON.

1919.			
Nov. 6.	To C. G. Major, commission	$	5 20
	Inspector of Municipalities		98 80

ESTATE OF MARIANA MASEAS.

1919.			
Nov. 17.	To S. Bowell (funeral)	$	78 00
	R.C. Hospital		3 00
	C. G. Major, commission		13 55
Dec. 2.	A. W. Petapiece		32 69
	T. S. Annandale		49 15
Dec. 8.	"Columbian"		3 60

ESTATE OF DAVID MARSHALL.

1919.			
Jan. 1.	To C. G. Major	$	1 10

ESTATE OF FREDERICK W. MARSH.

1919.			
Jan. 2.	To C. G. Major, commission	$	339 47
	Corbould & Grant		35 00
	Toronto General Trust		102 55

ESTATE OF JOSEPH MONJE.

1919.			
Jan. 9.	To "Columbian"	$	8 64
Dec. 18.	Probate duty		5 93

ESTATE OF ISAAC J. MADDAUGH.

1919.			
June 24.	To Lewis, premium on bond	$	10 00

ESTATE OF ROBERT MORDUE.

1919.			
Mar. 1.	To Corbould & Grant	$	804 85
	C. G. Major		103 49
July 7.	Dr. Marr		24 00
	Dr. Drew		15 00
	Dr. Manchester		25 00

ESTATE OF NORMAN MARTIN.

1919.			
Feb. 3.	To J. D. Kennedy, legal	$	53 63
	C. G. Major, commission		54 85
	G. E. Drew, professional services		25 00
	D. M. Murchie, funeral		133 50
	J. D. Kennedy, rent		120 00
Feb. 5.	"Columbian"		14 50

ESTATE OF GEORGE MCKAY.

1919.			
June 10.	To Bole & Braden, legal	$	71 33
July 21.	Expressage on trunk		50
Aug. 7.	"Columbian"		3 36
Nov. 3.	Thos. McKay, father		161 18
	C. G. Major, advance *re* trunk		20 65
	C. G. Major, commission		134 58

ESTATE OF SAMUEL MCLEAN.

1919.			
June 25.	To J. W. Creighton, taxes, 1918 and 1919	$	5 02
July 3.	J. H. Bowes, deed		23 15
July 15.	Copy of letters		1 00
Aug. 1.	G. W. Hamilton, wages		45 50
	E. A. Gamble		30 00

CR.

ESTATE OF THOS. ROBT. LOVE.

1919.			
Jan. 20.	By Bank of Montreal	$	1,422 13
Jan. 21.	Can. Home Invest.		12 54

ESTATE OF JOHN LONGO.

1919.			
Dec. 11.	By Royal Bank	$	119 40

ESTATE OF HEWEN MIDDLETON.

1919.			
Nov. 6.	By Townsend, interest to Aug. 22nd, 1919	$	104 00

1919.	ESTATE OF PATRICK J. MURPHY.		
Feb. 21.	By Compensation Board	$	10 82

ESTATE OF MARIANA MASEAS.

1919.			
Oct. 30.	By Anderson	$	176 00
	Armstrong		50 00
	Insley		30 00
	R.C. Hospital		15 00

ESTATE OF ISAAC J. MADDAUGH.

1919.			
Aug. 20.	By J. L. Crosby	$	6 00

ESTATE OF ROBERT MORDUE.

1919.			
Feb. 13.	By Ink, account mortgage	$	100 00
Feb. 22.	Ink, balance of mortgage		1,600 00

ESTATE OF NORMAN MARTIN.

1919.			
Jan. 14.	By Cash on person	$	180 00
	Canadian Bank of Commerce		882 15
Jan. 24.	Sale of effects		35 00

ESTATE OF GEORGE MCKAY.

1919.			
May 27.	By Royal Bank	$	216 60
July 21.	Dividend, Shelly stock		175 00

ESTATE OF SAMUEL MCLEAN.

1919.			
Feb. 6.	By Grant, account principal	$	250 00
Mar. 8.	" "		200 00
May 1.	Grant, balance principal and interest		132 50
July 15.	Sale of wagon		19 75

DR.

ESTATE OF MALCOLM McINTOSH.

1919.				
Oct.	30.	To Release of mortgage	$1,914	42
		Whiteside, Edmonds & Whiteside	19	50
Nov.	3.	Taxes advanced	18	00
		A. J. Stuart, M.D.	52	00
		Paterson, Chandler & Stephen	50	00
		C. G. Major, commission	237	50
Nov.	17.	E. W. Begelow, legal	58	50
Nov.	25.	J. A. Bates, advertising	2	80
		Thos. Quilty, notes and interest	195	00
		Catherine E. McIntosh, on account	500	00
Dec.	2.	Catherine E. McIntosh, balance	426	26
		Alfred A. McIntosh	463	13
		Ernest M. McIntosh	812	89

ESTATE OF MURDOCH McMURRAY.

1919.				
Dec.	4.	To J. D. Kennedy, legal	$	18 50
		C. G. Major, commission		31 25
		R. McMurray, funeral		40 00
		"Columbian," advertising		16 80
		R.C. Hospital		23 20
		Dr. Drew		229 45
		Surrey Municipality		235 75

ESTATE OF NORMAN McLEOD.

1919.				
Nov.	10.	To H. O. Alexander, O.G.	$	739 72

ESTATE OF MURDOCK McKENZIE.

1919.				
June	21.	To 1919 taxes	$	10 75

ESTATE OF NISHIMURA MASAJIRO.

1919.				
Feb.	21.	To Insurance premium	$	32 50
April	9.	Pearson & Co., insurance		33 50
Nov.	15.	Taxes		35 50

ESTATE OF GEORGE NICHOLSON.

1919.				
Aug.	1.	To McQuarrie & Martin	$	45 99
		Eleanor Burkett, heir		1,547 40
		Margaret Burkett, heir		1,547 41
		C. G. Major		391 95

ESTATE OF DAVID A. NICHOL.

1919.				
July	4.	To Three copies of letters	$	3 00
		Bank, transfer of bonds		1 50
Aug.	7.	"Columbian"		3 12
Oct.	1.	McQuarrie & Martin, legal		43 72
		C. G. Major		89 41
		Jas. Nichol, father		1,347 45

ESTATE OF JOSEPH O'GORMAN.

1919.				
Jan.	2.	To McQuarrie & Martin, legal	$	10 70
Jan.	9.	"Columbian"		3 00
Jan.	20.	Copy of letters		1 00
Feb.	3.	W. E. Fales, funeral		95 00
		C. G. Major, commission		6 38
		R.C. Hospital		11 69

ESTATE OF JOSEPH PREVOST.

1919.				
Sept.	2.	To Mary Gagne, board	$	21 00
June	20.	Taxes, 1919		9 60

CR.

ESTATE OF MATTHEW McCAULEY.

1919.				
Nov.	8.	By Dominion Govt., wages	$	9 00

ESTATE OF MALCOLM McINTOSH.

1919.				
Oct.	30.	By Sale of land, Soldiers' Settlement Board	$4,750	00

ESTATE OF MURDOCH McMURRAY.

1919.				
Nov.	21.	By Soldiers' Settlement Board, land-sale	$	595 00

ESTATE OF NORMAN McLEOD.

1919.				
Oct.	30.	By Life Insurance Co.	$	739 72

ESTATE OF NISHIMURA MASAJIRO.

1919.				
Mar.	18.	By Talsu, rent to March 31st, 1919	$	59 00
July	4.	Talsu, rent to June 30th, 1919		60 00
Oct.	16.	Talsu, rent to Oct. 30th, 1919		61 00
Dec.	17.	Rent		35 00

ESTATE OF GEORGE NICHOLSON.

1919.				
Jan.	21.	By Jennings, rent to Feb. 18th, 1919	$	7 50
Feb.	19.	Jennings, rent to Mar. 18th, 1919		7 50
Mar.	21.	Jennings, rent to April 18th, 1919		7 50
April	22.	Jennings, rent to May 18th, 1919		7 50
May	14.	Jennings, rent to June 18th, 1919		7 50
June	19.	Jennings, rent to July 18th, 1919		7 50
July	28.	Whiteside, Edmonds & Whiteside, land-sale		3,000 00

ESTATE OF DAVID A. NICHOL.

1919.				
July	4.	By Interest on bond	$	13 75
		Royal Bank		244 12
		Bank of Montreal		45 87
July	21.	P.O. Savings		344 46
Sept.	9.	Sale of bond		500 00
Sept.	30.	"		350 00

ESTATE OF JOSEPH O'GORMAN.

1919.				
Jan.	20.	By Royal Bank	$	61 85

DR.

ESTATE OF WILLIAM PARKINSON.

1919.			
Nov. 19.	To O.A., commission	$ 44	15
	Broughton & B., for heirs	4,329	31

ESTATE OF ANNIE M. PLEWS.

1919.			
Mar. 12.	To C. G. Major, copy of letters	$ 1	00
Mar. 27.	Mrs. Jno. Milsted, board of child	24	00
Nov. 3.	J. P. McMurphy, plumbing	5	08
Nov. 7.	Burnaby taxes, 1918 and 1919	7	36

ESTATE OF ANNIE E. RICHARDS.

1919.			
Mar. 10.	To H. N. Lidster, legal	$ 26	20
	C. G. Major, commission	22	97
April 4.	"Columbian"	3	60
April 8.	G. E. Drew	45	00
	S. Bowell, funeral	116	00
	R.C. Hospital	18	00
	Y.W.C.A.	20	59
	"Daily Sun"	1	05
	The World, Ltd.	1	50
	G. I. Blair	5	00
Nov. 19.	R. A. Braden, for heir	199	59

ESTATE OF JOHN ROBINSON.

1919.			
May 1.	To "Columbian"	$ 7	20
	C. G. Major, commission	10	00
	P. J. Foulds, half-interest in lots	40	07
	Whiteside, Edmonds & Whiteside	5	00
	S. J. Robinson	116	33
June 2.	Whiteside, Edmonds & Whiteside, legal	21	40

ESTATE OF JAMES H. RANKIN.

1919.			
Feb. 3.	To J. D. Kennedy, legal	$ 66	34
	Hospital account	46	25
	Patterson & Chandler	82	50
	C. G. Major, commission	171	70
Feb. 5.	"Columbian"	8	10
Feb. 9.	S. Bowell, funeral	56	00
May 8.	Commission *re* sale	80	00
June 12.	A. D. Matheson, services	15	00
July 3.	C. G. Major, commission	80	00
Oct. 16.	J. D. Kennedy, legal	15	00
	Lewis Cuttle, heir	137	75
	C. R. Cuttle, heir	137	75
	Vera R. Batchelor, heir	137	75
	Hilda W. Cuttle, heir	137	75
	Alex. Jno. Reynolds, heir	110	21
	Mona M. Young, heir	110	21
	Wallace Reynolds, heir	110	21
	Evangeline Gilbertson, heir	110	21
	Jno. H. Reynolds, heir	110	21
	Elizabeth R. McCoull, heir	551	09
	Ida M. R. Rowlatt, heir	551	09
	Margaret R. Scott, heir	551	09
	Geo. D. Rankin, heir	551	09
	Jno. Rankin, heir	551	09

ESTATE OF SUNI HEIKKI.

1919.			
Feb. 21.	To Exchange on cheque	$	60
	Duty	17	18
Feb. 28.	O. Adams, two trips to Vancouver	1	00
Mar. 6.	"Columbian"	7	20
	A. Haney	3	50
	Dr. Morse	17	50
	Carl Liiga	45	00
	E. Pope	38	80
	C. G. Major, commission	88	75
Mar. 10.	Corbould & Grant, legal	29	85
Mar. 18.	Perry & Mack, funeral	78	00

ESTATE OF RUSSELL SMITH.

1919.			
April 3.	To "Columbian"	$ 10	80
April 10.	Whiteside, Edmonds & Whiteside, legal	92	25
June 20.	Lindroos, account principal	575	00
	C. G. Major, cash advanced	480	00
June 25.	South Vancouver, taxes	58	55
	Langley, taxes	8	75

CR.

ESTATE OF WILLIAM PARKINSON.

1919.			
July 25.	By Baillie, interest to July 27th, 1919	$ 240	00
Oct. 18.	Anderson, principal in full	600	00
	Anderson, interest in full	43	00

ESTATE OF ANNIE M. PLEWS.

1919.			
Oct. 30.	By Rent, Williams, to Nov. 25th, 1919	$ 12	00
Nov. 26.	Williams, rent	4	00

ESTATE OF OLLE PEDERSON.

1919.			
Mar. 3.	By Sale of rifle	$ 8	10

ESTATE OF ANNIE E. RICHARDS.

1919.			
Feb. 24.	By Royal Bank	$ 361	90
	Y.W.C.A.	29	00
	Bank of Hamilton	8	17
	Bank of Hamilton trust account	60	43

ESTATE OF JOHN ROBINSON.

1919.			
April 25.	By Sale of lots	$ 200	00

ESTATE OF JAMES H. RANKIN.

1919.			
May 8.	By Sale of land	$1,600	00
Nov. 25.	Grain-growers' dividend	7	50

ESTATE OF SUNI HEIKKI.

1919.			
Feb. 21.	By E. Pope	$ 242	00
Feb. 28.	Royal Bank	589	64
	Bank of Nova Scotia	943	45

ESTATE OF RUSSELL SMITH.

1919.			
Mar. 21.	By Canadian Bank of Commerce	$ 757	73
June 20.	Whiteside, Edmonds & Whiteside	575	00

Dr.

Estate of Peter Smith.

1919.			
July 3.	To Corbould & Grant, legal ..	$	39 20
July 4.	R.C. Hospital		26 00
	C. G. Major		15 49
Aug. 7.	"Columbian"		5 04

Estate of Harry Shaw.

1919.			
July 22.	To 1919 taxes	$	9 60

Estate of Sham Singh.

1919.			
Jan. 2.	To Clute, legal	$	21 45
Jan. 9.	"Columbian," advertising ..		5 04

Estate of Singh Dola.

1919.			
Jan. 2.	ToJ. S. Clute, legal	$	19 80
Jan. 9.	"Columbian"		5 04
	Hokum Singh		54 88
	C. G. Major		3 03

Estate of Henry Scorey.

1919.			
June 10.	To Sarah Dooves, heir	$	125 00
	Maud Sharpe		125 00
	Florence Shook		41 66
	Lillian Shook		41 66
	Morlan Shook		41 66
	McQuarrie & Martin		27 25

Estate of Shikazo Shigeta.

1919.			
June 11.	To Japanese Consul	$	30 67

Estate of Alice Thorne.

1919.			
Jan. 1.	To Victory bond	$	50 00
Jan. 24.	"		100 00
Feb. 1.	Mental Hospital to Dec. 31st, 1918		107 66
	C. G. Major, commission ..		72 13
April 22.	Calland, commission and repairs		9 10
May 1.	Mental Hospital to March 1st, 1919		73 54
June 9.	Bonds		100 00
July 15.	Mental Hospital to June 30th, 1919		119 75
Sept. 8.	1919 taxes, Vancouver		124 46
Oct. 5.	Victory bonds		205 00
Oct. 15.	Premium on bonds		38 50
Oct. 22.	Repairs		40 50
	Water rates		5 10
	Calland, commission on rentals		7 25
Nov. 3.	Mental Hospital to Sept. 30th, 1919		115 50
Nov. 8.	Pearson & Co., insurance premium		37 50
Dec. 4.	Royal Fin. Corp., bonds ...		803 85
Dec. 6.	Alice Thorne, Christmas ...		200 00

Estate of William Thomas.

1919.			
Oct. 28.	To Redemption of tax-sale lots	$	146 96
Nov. 7.	"Columbian," advertising .		5 40
Dec. 4.	Fredk. Thomas		373 53
	Matheson & Jacobson, mdse.		32 55
	Annie T. Sclater, nurse ...		10 00
	H. C. Major		3 50
	Elizabeth Thomas		2 50
Dec. 23.	Whiteside, Edmonds & Whiteside, legal		75 65

Cr.

Estate of Peter Smith.

1919.			
June 5.	By Bank of Montreal	$	309 88

Estate of Henry Scorey.

1919.			
Feb. 26.	By McDonald, balance account land-sale	$	300 00
Dec. 3.	McDonald, land-sale		1,200 00
	McDonald, interest in full..		65 25

Estate of Alice Thorne.

1919.			
Jan. 1.	By Scurrah, account principal .	$	90 00
Mar. 1.	Interest on bond		2 50
Mar. 20.	Ingle, interest to Mar. 23rd, 1919		68 00
April 22.	Scurrah, interest		61 20
	Calland, rentals		80 00
April 25.	Reid, interest to April 5th, 1919		24 00
June 2.	Sutcliffe, interest to June 2nd, 1919		31 50
June 4.	Interest on bonds		80 88
June 9.	Miller, interest to June 5th, 1919		52 00
July 14.	Miller, account principal ..		100 00
	Reid, interest to July 5th, 1919		24 00
Aug. 22.	Jenks, interest to Aug. 30th, 1919		65 24
	Jenks, account principal ...		54 76
Sept. 9.	Interest on bond		2 50
Oct. 1.	Ingle, interest to Sept. 23rd, 1919		68 00
Oct. 5.	Miller, account principal ..		250 00
Oct. 20.	Scurrah, interest to Oct. 20th, 1919		55 00
Oct. 22.	Calland, rentals to Nov. 30th, 1919		145 00
Nov. 15.	Interest on bonds		55 20
Dec. 2.	Reid, interest to Oct. 5th, 1919		24 00
	Simpson, interest to Dec. 5th, 1919		44 65
	Scurrah, principal		750 00
	Scurrah, interest		4 50
	Sutcliffe, interest to Dec. 2nd, 1919		31 50

Estate of William Thomas.

1919.			
Oct. 23.	By Canadian Bank of Commerce	$	209 81
Nov. 7.	Burton, sale of Lots 14, 15		500 00
Nov. 24.	Lomas, sale of lots		50 00
	Elizabeth Thomas		73 48

DR.

ESTATE OF FRED G. TURNER.

1919.			
May 1.	To "Columbian"	$	5 40
	"World"		4 00
	C. G. Major, commission		23 90
	J. R. Grant, funeral		115 00
	J. R. Grant		3 38
June 2.	Corbould & Grant, legal		29 80
June 17.	K. L. Burnett		6 03
	Thos. Kidd		5 70
	Mrs. Elliott		212 25
	Canadian Bank of Commerce		42 71
	W. S. Holland		7 40

ESTATE OF TAKA YANO.

1919.			
Jan. 2.	To Corbould & Grant, legal	$	35 41
	Okada, cash advanced		105 00
Jan. 9.	"Columbian," advertising		5 04

ESTATE OF JOSEPH VOGEL.

1919.			
June 20.	To Taxes	$	12 00
July 7.	Taxes (balance)		50

ESTATE OF ERIK O. WESTER.

1919.			
Jan. 2.	To Whiteside, Edmonds & Whiteside, legal	$	35 04
Jan. 9.	"Columbian"		11 52
	D. Murchie & Son, funeral		75 00
	C. G. Major, commission		11 91
	R.C. Hospital		8 00
Mar. 18.	Swedish Consul		96 75

ESTATE OF GEORGE R. WARWICK.

1919.			
Jan. 2.	To Clute, legal	$	28 59
Jan. 9.	"Columbian," advertising		21 00
	C. G. Major, commission		32 28
Feb. 5.	C. Warwick		170 64
	Annie Gibbs		125 64
	Emma Warwick		125 64

ESTATE OF GEORGE A. WATSON.

1919.			
Feb. 3.	To Van. Fin. Co., interest	$	40 00
	C. G. Major, commission		159 10
Mar. 1.	J. A. Bates, advertising		5 00
Mar. 12.	C. G. Major		5 80
June 3.	"		8 20
June 10.	Ada Louise Watson		911 80

ESTATE OF A. M. WALKER.

1919.			
Dec. 2.	To Pearson & Co.	$	7 60

ESTATE OF MICHAEL JEREMIAH WARREN.

1919.			
Mar. 6.	To "Columbian"	$	3 96
Mar. 10.	W. A. Petapiece, legal		20 59
June 2.	C. G. Major, commission		6 72
	S. Bowell, funeral		89 00
	R.C. Hospital		14 26

ESTATE OF ALICE MAUD WOODSWORTH.

1919.			
May 6.	To Exchange	$	15
June 6.	"Columbian"		8 10
	Murchie, funeral		86 00
Dec. 2.	Mrs. G. Molyneux		50 00
Dec. 10.	H. C. Major		1 10

ESTATE OF YONG SUEY.

1919.			
Mar. 1.	To J. A. Bates	$	2 65
July 17.	J. H. Jones, funeral		93 50
	Chinese Consul, for heirs		35 77

CR.

ESTATE OF FRED G. TURNER.

1919.			
April 12.	By Royal Bank	$	356 25
	Cash on person		107 60
April 20.	P.O. Inspector		14 45

ESTATE OF JOSEPH VOGEL.

1919.			
July 22.	By Refund on taxes	$	10

ESTATE OF A. M. WALKER.

1919.			
Aug. 11.	By Dividend, Westminster Trust	$	16 00

ESTATE OF MICHAEL JEREMIAH WARREN.

1919.			
Feb. 13.	By R.C. Hospital	$	25 00
	Cash on person		48 62
	Royal Bank		10 91
Mar. 18.	J. J. Johnston, sale of bond		50 00

ESTATE OF ALICE MAUD WOODSWORTH.

1919.			
April 25.	By Bank of Montreal	$	277 16
May 6.	Land-sale		400 00
	Cash on person		20 38

C. G. MAJOR,
Official Administrator.

NELSON AND TRAIL ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JAMES STEWART.

1919.			
Aug. 31.	To Commission	$	1 25
Dec. 10.	"		1 30

ESTATE OF M. GLASER.

1919.			
May 31.	To Commission	$	30 00
	Taxes		12 95
Dec. 16.	O'Shea & Farris		90 72
	Emery & Paul, for heirs		466 33

ESTATE OF ROBERT DIXON.

1919.			
Mar. 31.	To Commission	$	35 00
April 30.	O'Shea & Farris, legal expenses		117 51
	Taxes		37 35
Oct. 31.	Commission		1 40

ESTATE OF OLE K. TOFTE.

1919.			
Jan. 31.	To Commission	$	16 75
	O'Shea & Farris, legal expenses		92 32

ESTATE OF GEO. H. FISCHER.

1919.			
May 31.	To Mining Recorder	$	5 00

ESTATE OF ARCHIE CHAPMAN.

1919.			
Mar. 31.	To Commission	$	5 00
Dec. 12.	Thos. Chapman, heir		429 45

ESTATE OF WM. MAHER.

1919.			
Feb. 28.	To Knights of Pythias, burial and expenses	$	140 10
	Commission		30 00
Mar. 31.	Mining Recorder		7 50
July 31.	O'Shea & Farris, legal expenses		59 46

ESTATE OF WM. BURGH.

1919.			
Dec. 10.	To Commission	$	4 17
	Dr. Kelso		7 50
	E. W. Somers, funeral		15 00
	C. Rollins		11 50
	Mrs. Wires, supplies		12 43
	Agnew & Co., groceries		4 55

ESTATE OF LOUIS TADICH.

1919.			
Feb. 28.	To O'Shea & Farris	$	51 87
	C. A. Clark, funeral		151 25
May 31.	Commission		3 00

ESTATE OF SYLVIAN WEILL.

1919.			
Jan. 31.	To Commission	$	5 35
Mar. 31.	"		3 70
	N. Binns, burial		128 00
April 30.	Commission		6 35
	Fees		2 00
	D. McDonald, legal fees		54 60

ESTATE OF PAOLA SODA.

1919.			
Jan. 31.	To Commission	$	47 00
May 15.	D. McDonald, legal fees		78 96

ESTATE OF THOMAS COMERFORD.

1919.			
Feb. 28.	To Commission	$	11 25
	Standard Furniture Co., burial		192 00
	Commission		5 95
	O'Shea & Farris, legal fees		41 45
July 31.	Commission		11 25
Sept. 30.	"		11 22

CR.

ESTATE OF JAMES STEWART.

1919.			
Aug. 21.	By Sale of lot	$	25 00
Dec. 9.	Sale of effects		26 00

ESTATE OF M. GLASER.

1919.			
May 7.	By Sale of dwelling	$	600 00

ESTATE OF ROBERT DIXON.

1919.			
Mar. 10.	By Sale of property	$	50 00
Mar. 31.	" "		650 00
Oct. 3.	Interest on mortgage		28 00

ESTATE OF OLE K. TOFTE.

1919.			
Jan. 31.	By Bank account	$	334 92

ESTATE OF ARCHIE CHAPMAN.

1919.			
Mar. 4.	By Proceeds of Victory bond	$	100 00

ESTATE OF WM. MAHER.

1919.			
Feb. 28.	By Sale of claims	$	600 00

ESTATE OF WM. BURGH.

1919.			
Dec. 9.	By Sale of effects	$	83 40

ESTATE OF LOUIS TADICH.

1919.			
May 8.	By Wages	$	60 00

ESTATE OF SYLVIAN WEILL.

1919.			
Jan. 25.	By D. McDonald	$	107 00
Mar. 10.	"		35 00
Mar. 31.	J. P. Morgan		39 00
April 15.	Bank of Commerce		65 80
	D. McDonald		61 25

ESTATE OF PAOLA SODA.

1919.			
Jan. 25.	By D. McDonald	$	940 00

ESTATE OF THOMAS COMERFORD.

1919.			
Jan. 17.	By Payment on note	$	225 00
Feb. 28.	Wages, etc.		119 00
July 23.	Payment on note		225 00
Sept. 29.	" "		224 40

DR.

ESTATE OF CLARK AND CAHILL.

1919.			
Feb. 28.	To Standard Furniture Co., burial	$	93 50
	Commission		5 60
July 31.	"		19 73
Aug. 31.	Standard Furniture Co., burial		93 50
	J. Henry		4 50
	H. Giegerich		11 85

ESTATE OF BILL MARKOWSKI.

1919.			
Sept. 30.	To O'Shea & Farris, legal fees	$	8 85
May 31.	Commission		2 72
Sept. 30.	D. J. Robertson, burial		42 83

ESTATE OF ANDREW G. ERICKSON.

1919.			
Mar. 31.	To Commission	$	54 30
	Standard Furniture Co., burial		225 50
	Probate duty		71 39
April 30.	Commission		25 36
	J. Dearin		15 00
	O'Shea & Farris, legal expenses		75 85
Dec. 12.	Taxes		17 90

ESTATE OF VIKTOR NELSON.

1919.			
Mar. 31.	To Commission	$	11 10
	Standard Furniture Co., burial		143 50
April 30.	O'Shea & Farris		31 85
May 31.	Commission		2 12

ESTATE OF V. MONIAGO.

1919.			
Mar. 18.	To Standard Furniture Co., burial	$	143 50
Mar. 31.	Commission		14 76
April 30.	O'Shea & Farris, legal fees		35 75

ESTATE OF WILLIAM KARSTUK.

1919.			
July 31.	To Commission	$	26 30
Aug. 31.	Standard Furniture Co., burial		143 50
Sept. 30.	O'Shea & Farris, legal fees, etc.		49 02

ESTATE OF DOMENICO PEZZETTI.

1919.			
April 30.	To Commission	$	2 59
	O'Shea & Farris, legal fees		6 45
	C. A. Clark, burial		42 83

ESTATE OF JOHN MIDDLETON.

1919.			
April 30.	To Commission	$	53 53
	Probate duty		43 50
	G. Stanfield		4 50
	O'Shea & Farris, legal fees		60 70
May 31.	Commission		4 48
Aug. 31.	Fees		1 40

ESTATE OF FREDERICK MCCLURE.

1919.			
April 30.	To Commission	$	6 84
	Geo. Hendron, burial		75 00
	Creston Hotel		6 00
	O'Shea & Farris, legal fees		10 85

ESTATE OF RONALD STONIER.

1919.			
May 31.	To Commission	$	86 52
	Standard Furniture Co., burial		216 20
	Mining Recorder		5 00
July 31.	Commission		13 11
Aug. 31.	O'Shea & Farris, legal fees		92 94

ESTATE OF THOMAS MELROSE.

1919.			
July 31.	To Commission	$	20 99
	Advertising		24 36
	Taxes		4 60
	"		13 00
Aug. 31.	Commission		11 08
	Noble Binns, burial		170 00
Sept. 30.	Wismer & McGreer, legal expenses		93 50
Dec. 10.	Commission		80 00
	Exchange		2 00

CR.

ESTATE OF CLARK AND CAHILL.

1919.			
Feb. 28.	By O'Shea & Farris	$	112 00
July 2.	Proceeds of bank account		394 64

ESTATE OF BILL MARKOWSKI.

1919.			
April 11.	By Sale of effects	$	2 10
	Wages		52 30

ESTATE OF ANDREW G. ERICKSON.

1919.			
Mar. 31.	By O'Shea & Farris	$1,085	97
April 9.	Sale of bond		507 25

ESTATE OF VIKTOR NELSON.

1919.			
Mar. 31.	By O'Shea & Farris	$	221 97
May 19.	Wages		42 50

ESTATE OF V. MONIAGO.

1919.			
Mar. 18.	By O'Shea & Farris	$	295 30

ESTATE OF WILLIAM KARSTUK.

1919.			
Mar. 18.	By Wages	$	44 10
July 2.	Proceeds of bank account		481 89

ESTATE OF DOMENICO PEZZETTI.

1919.			
April 16.	By Bank of Montreal	$	51 87

ESTATE OF JOHN MIDDLETON.

1919.			
April 16.	By Bank of Montreal	$1,070	58
May 28.	Wages		89 70

ESTATE OF FREDERICK MCCLURE.

1919.			
April 22.	By Bank of Commerce	$	136 82

ESTATE OF RONALD STONIER.

1919.			
May 19.	By Proceeds of bank account	$1,727	46
	Sale of effects		3 05
July 10.	Proceeds of bonds		262 23

ESTATE OF THOMAS MELROSE.

1919.			
June 9.	By Sale of bonds	$	213 50
July 2.	C.P.R., wages		44 99
	" "		86 64
	Proceeds of bank account		74 74
Aug. 28.	Sale of lot		221 55
Dec. 6.	Life insurance	1,600	00

DR.

ESTATE OF SAM UNDERHILL.

1919.			
July 31.	To Commission	$	26 50
Aug. 31.	"		71 98
Sept. 30.	Gilman Undertaking Co.		187 00
	O'Shea & Farris, legal fees		55 95
	Commission		5 00
	Salmo Trading Co.		15 15
	Dr. Epplen		50 00
	Dr. Fisk		30 00
	All Saints' Cathedral		10 00
	E. R. Northrop		70 00
	Sacred Heart Hospital		12 00

ESTATE OF C. E. SIMONSON.

1919.			
May 31.	To Taxes	$	19 05
	Commission		13 80
July 31.	O'Shea & Farris, legal fees		11 75

ESTATE OF M. LIPPA.

1919.			
Aug. 31.	To Commission	$	40 07
Sept. 30.	D. McDonald, legal fees		89 00
Oct. 31.	Commission		24 90

ESTATE OF ERNESTO PERIN.

1919.			
Aug. 31.	To Commission	$	20 50
Sept. 30.	D. McDonald, legal fees		38 35

ESTATE OF J. ZETSUNK.

1919.			
Sept. 30.	To Commission	$	2 55

ESTATE OF J. GEBHART.

1919.			
Sept. 30.	To Commission	$	2 48
Dec. 10.	"		1 37
	Expenses		6 00

ESTATE OF JOSEPH FISCO.

1919.			
Sept. 30.	To Commission	$	2 27
	O'Shea & Farris, legal fees		9 25

ESTATE OF WALTER TAYLOR.

1919.			
Sept. 30.	To Commission	$	4 63

ESTATE OF OWEN SAUNDERS.

1919.			
Sept. 30.	To Commission	$	7 88
	O'Shea & Farris, legal fees		13 95

ESTATE OF BEN JOHNSON.

1919.			
Oct. 31.	To Commission	$	2 88
	O'Shea & Farris, legal fees		14 70

ESTATE OF IVAN NACINK.

1919.			
Oct. 31.	To Commission	$	59 55

ESTATE OF STEPHEN DARBY.

1919.			
Dec. 9.	To Commission	$	7 00
	Taxes		14 25
	O'Shea & Farris, legal fees		24 95
	Standard Furniture Co., burial		93 80

ESTATE OF A. G. FLINT.

1919.			
Dec. 10.	To Commission	$	54 11

CR.

ESTATE OF SAM UNDERHILL.

1919.			
July 31.	By Sale of launch	$	530 00
Aug. 11.	Proceeds of bank account		1,439 73
Sept. 17.	Sale of bond		100 00

ESTATE OF C. E. SIMONSON.

1919.			
May 1.	By sale of property	$	276 16

ESTATE OF M. LIPPA.

1919.			
Aug. 28.	By Bank of Montreal	$	358 81
	" "		442 73
Oct. 3.	Sale of bond		498 00

ESTATE OF ERNESTO PERIN.

1919.			
Aug. 28.	By Proceeds of bank account	$	411 02

ESTATE OF J. ZETSUNK.

1919.			
Sept. 17.	By Wages	$	51 25

ESTATE OF J. GEBHART.

1919.			
Sept. 30.	By Wages	$	49 60
Nov. 28.	Sale of effects		27 50

ESTATE OF JOSEPH FISCO.

1919.			
Sept. 30.	By Provincial Police	$	45 50

ESTATE OF WALTER TAYLOR.

1919.			
Sept. 30.	By Proceeds of bank account	$	92 55

ESTATE OF OWEN SAUNDERS.

1919.			
Sept. 30.	By Proceeds of bank account	$	157 74

ESTATE OF BEN JOHNSON.

1919.			
Oct. 3.	By Sale of bond	$	57 98

ESTATE OF IVAN NACINK.

1919.			
Oct. 31.	By Savings account	$	1,191 73

ESTATE OF STEPHEN DARBY.

1919.			
Dec. 9.	By Sale of M.C.	$	140 00

ESTATE OF A. G. FLINT.

1919.			
Dec. 5.	By Proceeds of bank account	$	1,082 35

ESTATE OF FRED JURAGOWSKI.

1919.			
Dec. 20.	By Proceeds of bank account	$	465 87

ESTATE OF CARMINO PARMA.

1919.			
Dec. 26.	By Proceeds of bank account	$	316 75

ESTATE OF GUISEPPE SCLIPPA.

1919.			
Dec. 26.	By Proceeds of bank account	$	219 31

JAMES H. DOYLE.
Official Administrator.

GRAND FORKS ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ALEX. BATRYNOWSKI.

1919.			
April 8.	To Town Treasurer, Kerrobert, Sask., taxes on lots	$	3 24
July 26.	Town Treasurer, Kerrobert, Sask., taxes on lots		2 88

ESTATE OF MARGARETTA F. FOLGER.

1919.			
Feb. 12.	To Donald McCallum, commission	$	6 25
	Corporation of Grand Forks, taxes on real estate		62 00
Aug. 11.	Corporation of Grand Forks, taxes on real estate		46 35
Oct. 9.	H. L. Mackenzie, legal services		44 40

ESTATE OF THOMAS FOX.

1919.			
Mar. 8.	To W. O. Easton, crating personal effects	$	1 00
	P. C. Petersen, shipping and cartage		12 00
Mar. 17.	Grand Forks "Gazette" ..		8 80

ESTATE OF MICHAEL REILLY.

1919.			
May 8.	To Grand Forks "Gazette" ..	$	2 88
Sept. 10.	Corporation of City of Grand Forks, grave and digging		16 00
	H. L. Mackenzie		25 10
	Jas. H. Ryley, account L. Putzel hauling ties		87 09
	Rev. Father Pelletier, burial service		10 00
	Mrs. E. A. Cooper, funeral expenses		165 00
	Donald McCallum, commission, etc.		24 90

ESTATE OF BIAGIO DI CLAUDIO.

1919.			
May 8.	To Grand Forks "Gazette" ..	$	2 88
	Donald McCallum, commission, etc.		50 47
	Phoenix General Hospital ..		21 00
	Dr. Lee Smith		20 00
May 12.	Granby Store, Phoenix		2 20
	H. L. Mackenzie		42 47
May 20.	R. K. McCammon, funeral expenses		145 50

ESTATE OF NICK PUZNAK.

1919.			
May 8.	To Grand Forks "Gazette" ..	$	2 88
	Phoenix General Hospital ..		14 00
	Dr. Lee Smith		12 50
May 12.	Mrs. L. Swedberg		20 00
	H. L. Mackenzie		19 72
May 20.	R. K. McCammon, funeral expenses		115 00
May 23.	Donald McCallum, commission, etc.		10 72

ESTATE OF JOHN JUZWOW.

1919.			
May 8.	To Donald McCallum, commission, etc.	$	33 91
	John Miskulin, services and supplies		36 35
	Phoenix General Hospital .		21 00
	Dr. Lee Smith		15 00
	Grand Forks "Gazette" ...		2 88
May 12.	H. L. Mackenzie		27 64
May 20.	R. K. McCammon, funeral expenses		132 00

CR.

ESTATE OF MARGARETTA F. FOLGER.

1919.			
Jan. 9.	By A. D. Morrison, real estate	$	25 00
Jan. 18.	A. D. Morrison, balance on real estate		100 00
Aug. 29.	R. Logan, real estate		50 00

ESTATE OF THOMAS FOX.

1919.			
July 3.	By William James, on account of I.O.U.	$	50 00
Sept. 15.	William James, balance of I.O.U.		83 00

ESTATE OF MICHAEL REILLY.

1919.			
Feb. 27.	By Royal Bank of Canada	$	157 34
April 29.	John Donaldson, balance on wood		13 79
May 13.	G.N. Rly., ties		75 95
July 5.	" "		57 83
Aug. 30.	" "		35 75

ESTATE OF BIAGIO DI CLAUDIO.

1919.			
Feb. 28.	By Canadian Bank of Commerce, Phoenix	$	157 22
Mar. 14.	P.O. Savings Bank		601 11
Mar. 17.	Interest from War bonds ..		8 25
Mar. 21.	Bank of Montreal, Princeton		222 85
May 16.	H. C. Kerman, War bonds..		308 25

ESTATE OF NICK PUZNAK.

1919.			
Mar. 3.	By Granby Co., wages	$	57 20

ESTATE OF JOHN JUZWOW.

1919.			
Feb. 28.	By Canadian Bank of Commerce, Phoenix	$	403 72
Mar. 3.	Granby Co., wages		54 00
May 16.	H. C. Kerman, Victory bonds		102 76

ESTATE OF JOHN MIDDLETON.

1919.			
Jan. 18.	By Grand Forks Hospital	$	6 00
Jan. 20.	" "		5 00
Jan. 25.	Geo. Stanfield		2 70
Jan. 18.	Canadian Pacific Railway ..		43 80

DR.

ESTATE OF GUST POLUCHOVITCH.

1919.			
May 6.	To S. J. Matthews, loan repaid	$ 60	00
	Clark Bros., clothing	15	25
	Donald McCallum, commission	33	94
May 8.	Grand Forks "Gazette"	2	88
May 6.	Geo. Stanfield, cartage	1	00
May 8.	John P. Herr	26	00
May 9.	Steve Wucetich, loan repaid	10	00
May 10.	Carl Holm, tobacco	2	25
May 12.	Rev. Chas. Pelletier, burial service	10	00
	E. A. Cooper, funeral expenses	100	00
May 28.	H. L. Mackenzie	25	50

ESTATE OF FRED VATKIN.

1919.			
Oct. 9.	To James H. Ryley, solicitor's costs	$ 18	90
	G. A. Evans, publishing notice	2	88
	Donald McCallum, commission	3	99
Dec. 1.	Dr. C. M. Kingston	54	08

CR.

ESTATE OF GUST POLUCHOVITCH.

1919.			
Mar. 8.	By Geo. Stanfield	$	20
April 25.	Royal Bank of Canada	601	55
April 29.	Consolidated Mining & Smelting Co., wages	28	00
	Consolidated Mining & Smelting Co., wages	49	00

ESTATE OF RONALD GEORGE BILLINGSLEY.

1919.			
Sept. 5.	By P.O. Department	$ 3	30
Sept. 17.	„ „		36

ESTATE OF FRED VATKIN.

1919.			
Sept. 26.	By Great Northern Rly., wages	$ 77	75
Oct. 1.	Premium on U.S. cheque	2	10

ESTATE OF MIKE SCHIEK.

1919.			
Oct. 10.	By Geo. Stanfield	$ 11	75

ESTATE OF JOHN MAY.

1919.			
Nov. 30.	By John Peterson	$ 18	79

DONALD McCALLUM,
Official Administrator.

YALE AND LILLOOET ELECTORAL DISTRICTS.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF J. MACK.

1919.			
Nov. 8.	To Shuswap Mack	$ 351	02

ESTATE OF TAYLOR HAYDEN.

1919.			
Nov. 10.	To M. L. Grimmett	$ 817	41

ESTATE OF ROBERT MARKEN.

1919.			
Nov. 12.	To L. N. Pedersen	$ 307	91

ESTATE OF A. N. WISMER.

1919.			
Nov. 13.	To M. L. Grimmett	$ 52	44
Dec. 1.	W. C. Parker	77	66
	Minnie Grimmett	15	85
	Lillie May Way	451	40
	John Noble Bestwick	42	99
	Leslie Bestwick	42	99
	Walter George Bestwick	150	47

ESTATE OF DANIEL CAREY.

1919.			
Dec. 15.	To W. H. Carey	$1,257	06

CR.

ESTATE OF A. N. WISMER.

1919.			
Dec. 31.	By Cash	$1,048	75

ESTATE OF A. G. JARVIS.

1919.			
Dec. 31.	By Cash	$ 12	00

M. L. GRIMMETT,
Official Administrator.

CRANBROOK ELECTORAL DISTRICT

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN BUSK.

1919.			
Sept. 9.	To Deceased's mother	$	868 96

ESTATE OF JOSEPH CARSTINE (OR CORISTINE).

1919.			
Aug. 7.	To Commission	$	22 30
	Probate duty		21 88
	F. M. MacPherson, funeral expenses		180 50
	St. Eugene Hospital		123 50
	Cranbrook "Courier"		4 68
Aug. 21.	Macdonald & Nisbet		25 00
	P. Matheson		25 00
	Gurd & Spreull		5 00

ESTATE OF WILLIAM COLE.

1919.			
May 23.	To Probate duty	$	26 44
June 7.	Commission		2 15
	Express on blankets		45
June 16.	F. M. MacPherson, funeral expenses		181 00
July 7.	Commission		19 28
	Macdonald & Nisbet		26 90
Sept. 7.	Commission		7 50

ESTATE OF ATTILIO FRASCURATI.

1919.			
Jan. 22.	To F. M. MacPherson, funeral expenses	$	90 00
Feb. 7.	Commission		5 30

ESTATE OF GUST FORSBERG.

1919.			
Jan. 18.	To Macdonald & Nisbet	$	6 50
Dec. 7.	Standard Trust Co., Edmonton, Alta., administrators		96 63

ESTATE OF KNUT FROROTH.

1919.			
Jan. 7.	To Advertising	$	4 80
Mar. 21.	Macdonald & Nisbet		10 30

ESTATE OF WM. JOHN HAMILTON.

1919.			
Dec. 2.	T. St. Eugene Hospital	$	23 50
Dec. 5.	F. M. MacPherson, funeral expenses		200 05
Dec. 7.	Commission		11 75

ESTATE OF HENRY HOGBERG.

1919.			
Oct. 28.	To Probate duty	$	3 78
Nov. 7.	Commission		19 60
	Advertising		4 80
Dec. 1.	Macdonald & Nisbet		32 00

ESTATE OF INGWALD O. HOLDEN.

1919.			
Sept. 7.	To Commission	$	68

ESTATE OF MIKE HARRAS.

1919.			
Feb. 7.	To Commission	$	4 50
Mar. 13.	Probate duty		7 45
April 29.	F. M. MacPherson, funeral expenses		158 00
May 7.	Advertising		4 68
	Commission		33 20
July 7.	Macdonald & Nisbet		26 90

ESTATE OF STEVE HAWRYLKWI.

1919.			
Jan. 29.	To F. M. MacPherson, funeral expenses	$	25 00
Feb. 7.	Commission		2 10
Mar. 13.	Probate duty		7 07
June 7.	Commission		33 60
	St. Eugene Hospital		15 00
	Advertising		4 68

CR.

ESTATE OF JOSEPH CARSTINE (OR CORISTINE).

1919.			
July 10.	By Royal Bank	$	437 74
	Interest		7 88

ESTATE OF WILLIAM COLE.

1919.			
May 23.	By Otis-Staples Lumber Co., wages	$	43 00
June 16.	Cash found on person		95
	Bank of Commerce		377 98
	Interest		6 71
Aug. 28.	War bonds		150 00

ESTATE OF ATTILIO FRASCURATI.

1919.			
Jan. 14.	By Cash found on person	$	106 10

ESTATE OF WM. JOHN HAMILTON.

1919.			
Nov. 12.	By Cash found on person	$	210 50
Nov. 21.	East Kootenay Lumber Co.		24 80

ESTATE OF HENRY HOGBERG.

1919.			
Oct. 28.	By Imperial Bank	$	387 40
	Interest		4 35

ESTATE OF INGWALD O. HOLDEN.

1919.			
Aug. 19.	By Cash found on person	$	13 55

ESTATE OF MIKE HARRAS.

1919.			
Jan. 29.	By Staples Lumber Co., wages	$	43 20
	Victory bond		47 00
April 29.	Bank of Commerce		657 40
	Interest		6 57

ESTATE OF STEVE HAWRYLKWI.

1919.			
Jan. 29.	By Cash found on person	$	42 00
May 8.	P.O. Savings Bank		477 58
May 10.	Bank of Commerce		194 55

DR.

ESTATE OF ANDREW HILGREN ALIAS ANDREW HALGREN.

1919.			
Mar. 13.	To Probate duty	$	32 85
Mar. 21.	Macdonald & Nisbet		37 85

ESTATE OF THOMAS MYDDLETON JONES.

1919.			
July 7.	To Provincial and school taxes, 1918-19	$	9 97

ESTATE OF NIC KASPAR.

1919.			
Mar. 7.	To Commission	$	2 30

ESTATE OF JOHN KASPAR.

1919.			
Jan. 7.	To Commission	$	25 60
	Advertising		9 60
Mar. 21.	Macdonald & Nisbet		24 40

ESTATE OF LARS LARSEN.

1919.			
Sept. 7.	To Commission	$	2 00

ESTATE OF JOE MICHELSON.

1919.			
May 7.	To Commission	$	1 05

ESTATE OF JOHN D. MASON.

1919.			
Feb. 7.	To Commission	$	1 50
Mar. 13.	Probate duty		2 04
May 7.	Provincial taxes, Kimberley		3 28
	Commission		8 05
	J. S. Fisher		25 05
July 7.	Commission		3 23
Oct. 7.	Commission		7 50
Dec. 1.	Macdonald & Nisbet		53 40
Dec. 7.	Commission		2 15

ESTATE OF ANTONIO MONTICO.

1919.			
April 7.	To Commission	$	33 40
July 7.	Macdonald & Nisbet		26 90
Dec. 10.	Royal Consul-General of Italy, Montreal		607 72

ESTATE OF ARTHUR W. MORAN.

1919.			
Sept. 7.	To Commission	$	3 75
Sept. 20.	F. M. MacPherson, monument		71 25

ESTATE OF C. F. MORRISON.

1919.			
Feb. 3.	To Probate duty	$	1 62
Mar. 21.	Macdonald & Nisbet		24 40
April 7.	Jonathan Morrison		73 50

ESTATE OF RUDOLF OLSON.

1919.			
Feb. 7.	To Commission	$	1 25

ESTATE OF JOE POTAPOCHUK.

1919.			
Mar. 7.	To Commission	$	2 30

ESTATE OF JOHN PETERSON.

1919.			
Mar. 21.	To Macdonald & Nisbet	$	24 40

ESTATE OF W. RIDDELL.

1919.			
Mar. 7.	To Commission	$	15

ESTATE OF RAKHA RAM.

1919.			
Jan. 7.	To C. H. Martin, expenses	$	17 50
	Commission		2 10
Feb. 3.	Probate duty		20 56
Mar. 7.	Commission		15 15
	Cabal Singh, funeral expenses		105 00
Mar. 21.	Macdonald & Nisbet		24 40

CR.

ESTATE OF NIC KASPAR.

1919.			
Feb. 18.	By Crow's Nest Pass Lumber Co.	$	46 12

ESTATE OF LARS LARSEN.

1919.			
Aug. 18.	By Cash found on person	$	40 20

ESTATE OF JOE MICHELSON.

1919.			
Mar. 17.	By Cash found on person	$	21 00

ESTATE OF JOHN D. MASON.

1919.			
Jan. 29.	By Cash found on person	$	4 35
	C.M. & S. Co., wages		26 15
May 1.	Imperial Bank		10 67
	Interest		15
	Sale of lot, Kimberley		150 00
June 28.	Royal Bank, Truro		64 68
Sept. 17.	Sale of lot, Kimberley		150 00
Dec. 2.	Sale of five shares, New World Life Insurance stock		43 73

ESTATE OF ANTONIO MONTICO.

1919.			
Mar. 25.	By Bank of Commerce	$	663 06
	Interest		4 96

ESTATE OF ARTHUR W. MORAN.

1919.			
Aug. 21.	By Gamble Mining Co., stock certificate	$	75 00

ESTATE OF RUDOLF OLSON.

1919.			
Jan. 18.	By Imperial Bank	$	24 90

ESTATE OF JOE POTAPOCHUK.

1919.			
Feb. 18.	By Crow's Nest Pass Lumber Co.	$	46 80

ESTATE OF W. RIDDELL.

1919.			
Feb. 18.	By Crow's Nest Pass Lumber Co.	$	3 37

ESTATE OF RAKHA RAM.

1919.			
Feb. 18.	By Imperial Bank	$	303 69

DR.

ESTATE OF HUGH ROBISON.

1919.			
April 9.	To F. M. MacPherson, funeral expenses	$ 175	00
	Probate duty	25	06
	Commission	125	35
	Telegram to Monarch Life		90
	Exchange on Monarch Life cheque	3	10
April 29.	Copy of death certificate		50
July 7.	Macdonald & Nisbet	63	60
Sept. 20.	R. J. Binning	10	00
	Monument	75	00
	Father of deceased and heir	2,028	34

ESTATE OF MRS. ANNA KINGSBERRY ROBSON.

1919.			
Mar. 7.	To F. M. MacPherson, funeral expenses	$ 270	00
	Legal fees	10	00
	W. H. Robson, guardian (balance of estate)	2,803	44

ESTATE OF FRANCIS GEORGE SETTER.

1919.			
Oct. 8.	To Commission	$ 9	90
Oct. 28.	Probate duty	2	50
Nov. 7.	Commission	16	65
	Advertising	4	80
Dec. 1.	Macdonald & Nisbet	27	00
Dec. 7.	Commission		55

ESTATE OF B. SHANNON.

1919.			
Mar. 7.	To Commission	$	85

ESTATE OF HANAM (OR HARNAM) SINGH.

1919.			
Feb. 7.	To Commission	$ 1	75
Mar. 13.	Probate duty	9	80
Mar. 25.	F. M. MacPherson, funeral expenses	100	00
April 7.	Commission	47	60
	Cabel Singh, expenses	11	00
April 14.	Hurdah Singh	108	00
Dec. 1.	Macdonald & Nisbet	45	40

ESTATE OF PARTAB (PORTAPA OR PORTPA) SINGH.

1919.			
April 7.	To F. M. MacPherson, funeral expenses	$ 110	50
	Commission	39	00
	Probate duty	7	76
July 7.	Macdonald & Nisbet	26	90
Nov. 8.	Dep. Comr. of the Jullundur District, Jullundur City, Punjab, India (for heirs)	595	92

ESTATE OF FRANK SMITH.

1919.			
Jan. 7.	To Commission	$ 6	95
Feb. 3.	Probate duty	6	92
Mar. 21.	Macdonald & Nisbet	24	40
Oct. 9.	C. L. Schilling, heir	100	28

ESTATE OF EMILE TOUSSAINT.

1919.			
Jan. 7.	To Commission	$ 7	75
Feb. 3.	Probate duty	1	60
Mar. 21.	Macdonald & Nisbet	24	40
	Joseph Brault	29	50

ESTATE OF OSCAR WICKLUND.

1919.			
Sept. 7.	To Commission	$ 1	15
	F. M. MacPherson, expenses	22	05

CR.

ESTATE OF HUGH ROBISON.

1919.			
April 9.	By Cash found on person	$	75
	W. Rankin, wages	6	10
	Monarch Life Assurance Co.	2,500	00

ESTATE OF MRS. ANNA KINGSBERRY ROBSON.

1919.			
Feb. 10.	By North West Commercial Travellers' Association	$ 340	00
Feb. 17.	Furniture	118	00
	Masonic Temple stock	25	00
Feb. 21.	Great West Life Assurance Co.	1,000	00
Feb. 26.	Canada Life Assurance Co.	1,000	00
Mar. 7.	Royal Bank	100	44
	Macdonald & Nisbet, Cranbrook Jobbers' stock	500	00

ESTATE OF FRANCIS GEORGE SETTER.

1919.			
Sept. 27.	By Cash found on person	$ 25	85
	East Kootenay Lumber Co.	115	80
Sept. 29.	East Kootenay Lumber Co., wages	56	70
Oct. 22.	Imperial Bank	300	00
	Interest	1	00
	Board of Pensions	32	42
Nov. 10.	Board of Pensions	11	25

ESTATE OF B. SHANNON.

1919.			
Feb. 18.	By Crow's Nest Pass Lumber Co.	$ 17	85

ESTATE OF HANAM (OR HARNAM) SINGH.

1919.			
Jan. 29.	By Cash found on person	$ 35	15
Mar. 12.	Crow's Nest Pass Lumber Co., wages	16	40
Mar. 25.	Royal Bank	929	17
	Interest	6	68

ESTATE OF PARTAB (PORTAPA OR PORTPA) SINGH.

1919.			
Mar. 31.	By Imperial Bank	$ 656	40
	Interest	3	30
April 1.	Ross-Saskatoon Lumber Co., wages	20	38
April 2.	Sale of Victory bond	100	00

ESTATE OF OSCAR WICKLUND.

1919.			
Aug. 28.	By C.P.R., wages	$ 23	20

J. A. ARNOLD,
Official Administrator.

SIMILKAMEEN ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

1919.		ESTATE OF JOHN DYNKA.	
April 13.	To	Commission	$ 20 42
		Probate duty	20 42
May 3.		Burial expenses	18 75
June 11.		Costs, letters of administration	43 58
Oct. 28.		Hospital, Hedley	65 80
1919.		ESTATE OF JOHN PEDERUNK.	
April 13.	To	Commission	$ 74 57
		Probate duty	74 58
May 3.		Burial expenses	18 75
June 11.		Costs, letters of administration	54 18
Oct. 28.		Hospital, Hedley	101 00
1919.		ESTATE OF G. BJORKMAN.	
Dec. 11.	To	Commission	$ 19 57

CR.

1919.		ESTATE OF JOHN DYNKA.	
April 9.	By	Bank of Montreal, Hedley	$ 408 35
1919.		ESTATE OF JOHN PEDERUNK.	
April 3.	By	Bank of Commerce, Cranbrook	$ 506 55
		Imperial Bank, Fernie	985 02
1919.		ESTATE OF G. BJORKMAN.	
Dec. 2.	By	Swedish Consul, Montreal	$ 391 56

JAS. R. BROWN,
Official Administrator.

GREENWOOD ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

1919.		ESTATE OF ELEANOR MILLS.	
May 10.	To	Probate duty	$ 43 35
June 23.		Funeral expenses	200 00
Oct. 21.		Journey to Ferry, Wash.	4 00
July 29.		Postage and telephone	3 50
		Commission	48 42
July 10.		Cost of draft	87
Aug. 1.		J. A. Fraser	3 00
		R. T. Lowery	6 72
		Dr. Wood	32 50
Oct. 14.		Cost of money-order	15
		Postage and stationery	2 02
		Anna Doyle	72 10
		James Clarke	72 10
		Edw. Rolston	72 10
		Lila Olson	72 10
		Maud Wilson	72 10
		F. E. McLean	72 10
		E. A. LaPointe	72 10
		H. H. Rolston	72 10
		W. A. Rolston	72 10
1919.		ESTATE OF GEORGE MCLAREN.	
Jan. 15.	To	Probate duty	$ 22 09
Feb.		"Ledger," advertising	7 85
June 13.		Flemming	1 00
June 31.		Commission	100 00
June 28.		Cost of draft	2 30
Aug. 1.		I. H. Hallett	57 40
		J. H. Goodeve	9 00
		Dr. Wood	150 00
Aug. 8.		Registration on watch	20
		Express on trunk	9 90
Aug. 11.		J. B. McLaren, watch	50 00
		Mrs. Hay, trunk and contents	30 00
Sept. 13.		Commission	32 20
		Postage and stationery	4 54
		J. R. McLaren	210 02
		Mrs. Hay	230 02
		K. A. McLaren	260 02
		S. McLaren	260 02
		Mrs. K. McLennan	260 02
		H. McLaren	260 02
		J. H. McLaren	260 02

CR.

1919.		ESTATE OF ELEANOR MILLS.	
June 19.	By	Life policy, Equitable Life Assurance	$ 968 43
Oct. 14.		Cash	25 00
1919.		ESTATE OF GEORGE MCLAREN.	
Aug. 14.	By	Bank of Commerce	$1,355 23
		Interest	10 22
		Work-cheques	391 10
		Interest	19 09
		"	13 75
		"	18 61
		Sale of War bond	496 00

Dr.				Cr.			
1919.	Estate of T. A. McDonald.			1919.	Estate of T. A. McDonald.		
Mar. 22.	To Exchange on cheque	$	55	Mar. 22.	By J. R. Brown, Fairview	$	222 40
	J. R. Brown, Eccles purchase		222 40				
1919.	Estate of Robert Gillian.			1919.	Estate of Robert Gillian.		
June 16.	To Probate duty	$	13 06	June 23.	By Proceeds of auction	$	1,416 47
April 22.	Journey to Rock Creek		4 00	Oct. 14.	Cash		20 00
July 30.	Postage		1 50				
	Commission		70 82				
	Cost of draft		1 75				
Oct. 16.	G. Duschane		61 95				
	E. Hatton		174 00				
	J. A. Fraser		7 00				
	N. B. Kelsey		106 50				
	N. Robinson		56 75				
	G. B. Gane		34 00				
	R. T. Lowery		7 00				
	A. C. Mesker		73 05				
1919.	Estate of W. Douglas.						
July 14.	To Mrs. M. Desmayes	$	28 25				
Aug. 1.	I. H. Hallett		41 16				

E. F. SMITH,
Deputy Official Administrator.

OMINECA MINING DIVISION.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.				Cr.			
1919.	Estate of John Barrett.						
Dec.	To Taxes	$	1 45				
	Estate of Ernest Sarsons Cheatle.				Estate of Ernest Sarsons Cheatle.		
1919.				1919.			
Jan. 9.	To Voucher	$	1 90	June 7.	By W. S. Henry	$	73 25
Mar. 22.	„		11 02	Nov. 19.	Constable Cline		1 00
	„		79 10				
	„		4 75				
	„		65 00				
April 14.	„		10 75				
June 4.	„		40 00				
July 12.	„		3 66				
	„		28 49				
	Estate of Julius Nels Carlson.				Estate of Julius Nels Carlson.		
1919.				1919.			
Aug. 2.	To Sam Alger, digging grave	$	10 00	Aug. 1.	By Cash found on body	$	73 42
Aug. 6.	A. E. Phillips, coffin		29 50				
Sept. 5.	Voucher		3 77				
	„		2 25				
1919.	Estate of William Hugh Corbett.			1919.	Estate of William Hugh Corbett.		
Oct. 17.	To Voucher	$	7 41	Sept. 4.	By Dr. H. C. Wrinch	$	10 60
	„		6 00	Sept. 30.	A. Fairbairn		137 65
1919.	Estate of Ronald C. Ferguson.			1919.	Estate of Ronald C. Ferguson.		
Mar. 15.	To Voucher	$	7 05	Feb. 28.	By Constable Kelly	$	5 00
Mar. 21.	Exchange		65	Mar. 21.	Union Bank of Canada		225 90
April 5.	Voucher		11 54	Aug. 12.	Dybhavn & Harrison		75 15
	„		5 20	Aug. 21.	„ „		225 55
	„		32 30				
June 13.	„		65 00				
	„		11 50				
Aug. 11.	„		25 45				
Aug. 15.	Exchange		15				
Aug. 21.	„		55				
Aug. 29.	Voucher		6 00				
Sept. 5	„		18 15				
	„		32 00				
	„		78 00				
	„		6 25				
Sept. 12.	„		25 00				
	„		17 50				
Dec. 24.	Mary McKinnon		71 96				
	Catherine McTaggart		10 28				
	Sarah McTaggart		10 28				
	Mary Ann Hall		10 28				
	Hugh McDougall		10 28				
	John McDougall		10 28				
	Archie McDougall		10 28				
	Donald McDougall		5 14				
	Archibald McDougall		5 14				
	Estate of Alex. Ferguson		71 96				

DR.

ESTATE OF PERCY T. HEWITT.

1919.			
July 12.	To Voucher	$	4 01
Nov. 21.	,,		6 00
Dec. 3.	,,		26 42

ESTATE OF AUGUST HATT.

1919.			
June 4.	To Voucher	$	63 46

ESTATE OF PRYCE HUGHES.

1919.			
April 24.	To Voucher	$	11 45
May 16.	Exchange		25
June 4.	Voucher		3 00
Aug. 29.	,,		75 06
	,,		75 06
	,,		75 07
	,,		75 07
	,,		75 07
	,,		75 07
	,,		75 07

ESTATE OF GEO. P. HAZELTON.

1919.			
Mar. 7.	To N. Svenson, funeral	$	82 00
	Voucher		11 84
May 7.	,,		4 10
June 4.	,,		1 65
June 6.	,,		5 00
	,,		3 50
July 12.	,,		7 65
Aug. 4.	Exchange		50
Aug. 5.	Voucher		8 19
Aug. 11.	,,		12 50
Sept. 5.	,,		10 34
Oct. 3.	,,		41 95
Oct. 17.	,,		50
	,,		4 80

ESTATE OF HELGE G. HANSON.

1919.			
May 7.	To Voucher	$	1 39

ESTATE OF FREDERICK S. W. JENNINGS.

1919.			
Oct. 17.	To Voucher	$	14 40
	,,		28 05
	,,		6 00

ESTATE OF CARL JOHNSON.

1919.			
Dec. 3.	To Voucher	$	3 25

ESTATE OF JOHN ERICK LINDQUIST.

1919.			
Jan. 9.	To Voucher	$	60
Feb. 8.	,,		60
June 4.	,,		25 60
July 12.	,,		2 00
Sept. 5.	,,		1 00
Dec. 3.	,,		1 00

ESTATE OF WILLIAM MCAVOY.

1919.			
July 10.	To Voucher	$	83 52
	,,		8 10

ESTATE OF WILLIAM J. MCAFEE.

1919.			
Jan. 20.	To Exchange	$	45
Feb. 10.	Voucher		50 00
	,,		40 85
	,,		14 77
	,,		17 90
	,,		8 80
	,,		165 03
	,,		8 50
	,,		31 75
Oct. 23.	,,		21 15

CR.

ESTATE OF PERCY T. HEWITT.

1919.			
Oct. 23.	By F. B. Chettleburgh	$	7 00
Nov. 19.	,, ,,		493 25
	Constable Cline		8 50
	F. B. Chettleburgh		75

ESTATE OF AUGUST HATT.

1919.			
May 30.	By T. T. Bell	$	63 26
	Premium allowed by bank		1 85

ESTATE OF PRYCE HUGHES.

1919.			
May 15.	By Arthur Jacks	$	60 75

ESTATE OF GEO. P. HAZELTON.

1919.			
Feb. 25.	By Cash found on body	$	16 85
	E. C. Barger		12 00
	Barger & Barger		5 00
	L. Schorn		203 10
April 4.	J. Kelly		16 00
	J. C. Williams		25 00
April 10.	Thorp & Hoops		1 52
April 25.	J. Kelly		39 50
May 27.	A. Fairbairn		33 00
July 14.	,,		2 00
July 28.	Union Bank of Canada		250 00
Aug. 4.	Canadian Bank of Commerce		207 34
Sept. 4.	A. Fairbairn		10 00
Dec. 17.	,,		1 00

ESTATE OF HELGE G. HANSON.

1919.			
April 10.	By Cash found on body	$	20 10
April 22.	Roderick McDonald		7 20
May 5.	C. L. Peterson		57

ESTATE OF FREDERICK S. W. JENNINGS.

1919.			
Sept. 23.	By Draft	$	64 95

ESTATE OF CARL JOHNSON.

1919.			
Nov. 19.	By H. Taylor	$	65 00

ESTATE OF JOHN ERICK LINDQUIST.

1919.			
Jan. 16.	By A. MacArthur	$	12 00
June 4.	A. E. Phillips		20 00
June 6.	Arthur Leveret		20 00
Aug. 14.	,,		20 00
Oct. 23.	,,		20 00
Dec. 20.	,,		20 00

ESTATE OF WILLIAM MCAVOY.

1919.			
Dec. 6.	By Thomas Westgarde	$	10 00
Dec. 29.	,,		811 50

ESTATE OF WILLIAM J. MCAFEE.

1919.			
Jan. 20.	By Williams & Manson	$	295 42

DR.

ESTATE OF ALLAN A. McMILLAN.

1919.			
April 5.	To Voucher	$	80 00
	,,		26 70
	,,		13 90
	,,		199 31
April 14.	,,		11 95
April 19.	,,		100 00
May 7.	,,		29 00
Dec. 6.	,,		27
	,,		13 25
	,,		39 50
	,,		4 50
	,,		128 75
	,,		10 00
	,,		47 25
	,,		275 80
	,,		360 89
	,,		256 00
Dec. 9.	,,		5 00

ESTATE OF JOHN WALTER MacKENDRICK.

1919.			
April 5.	To Voucher	$	5 00
	,,		5 15
May 4.	,,		19 65
May 7.	,,		2 00
Sept. 5.	,,		1 00
Oct. 17.	,,		45 00
	,,		3 60
Oct. 20.	,,		876 51
	,,		210 37

ESTATE OF ROBERT FINLAYSON MacKAY.

1919.			
Sept. 5.	To Voucher	$	97 53
	,,		164 93
	,,		135 05
Dec. 3.	,,		10 45

ESTATE OF ARTHUR ROBERT OAKES.

1919.			
April 5.	To Voucher	$	7 20
May 7.	,,		31 45
	,,		446 24

ESTATE OF JAMES GILBERT POWELL.

1919.			
May 5.	To Exchange	$	25
May 7.	Voucher		121 92
	,,		332 28
	,,		32 30
	,,		15 18
	,,		6 00
	,,		150 00
	,,		7 25
	,,		11 50
	,,		56 50
	,,		5 00
	,,		35 00
	,,		90 26
	,,		3 40
	,,		36 10
	,,		21 50
May 17.	,,		250 00
May 19.	,,		30 99
June 4.	,,		2 50
June 26.	Exchange		25
June 27.	Voucher		449 23
July 12.	,,		10 00
	,,		95 00
Oct. 3.	,,		876 51

ESTATE OF ERIC PEDERSON.

1919.			
Feb. 10.	To Voucher	$	51 92
	,,		47 00
	,,		85 50
April 5.	,,		1 25
April 7.	,,		62
July 12.	,,		43 24
Sept. 12.	,,		8 29
Oct. 24.	,,		9 83
Oct. 31.	,,		7 48
Nov. 3.	,,		41 50
	,,		5 40

CR.

ESTATE OF ALLAN A. McMILLAN.

1919.			
Mar. 21.	By Henry Gushwa	$	1,600 00

ESTATE OF JOHN WALTER MacKENDRICK.

1919.			
Mar. 15.	By A. Palmer	$	100 00
April 13.	,,		40 00
Sept. 23.	H. E. A. Courtenay		900 00

ESTATE OF RODERICK McCRIMMON.

1919.			
Nov. 19.	By Constable Cline	$	3 00

ESTATE OF ROBERT FINLAYSON MacKAY.

1919.			
Aug. 20.	By Miss MacKay	$	381 00
	Premium on cheque		13 30
Sept. 4.	Miss MacKay		5 70
Nov. 26.	,,		15 00

ESTATE OF JAMES GILBERT POWELL.

1919.			
Mar. 25.	By Provincial Treasury	$	2 40
May 5.	J. G. Powell		103 25
	Mutual Life Assurance Co.		2,000 74
May 7.	Union Bank of Canada		332 28
June 26.	Eldridge & Co.		200 25

ESTATE OF ERIC PEDERSON.

1919.			
Jan. 30.	By Cheques on body	$	1,038 48
Mar. 18.	Christie Grant		25 00
April 4.	Constable Fairbairn		12 50

DR.

ESTATE OF GEORGE A. REEDER.

1919.			
July 14.	To Exchange	$	75
Aug. 11.	Voucher		3 61

ESTATE OF RAMOND W. SHAW.

1919.			
Dec. 3.	To Voucher	$	70

ESTATE OF SUE CHONG.

1919.			
Jan. 9.	To Voucher	$	1 31
April 16.	„		257 59

ESTATE OF CHARLES H. SPENCER.

1919.			
Feb. 8.	To Voucher	$	1 25

ESTATE OF LESLIE PERCIVAL SUTCLIFFE.

1919.			
Feb. 10.	To Voucher	$	20 23

ESTATE OF GEORGE WALLACE.

1919.			
Jan. 1.	To Voucher	$	63 56
	„		382 68
	„		30 00
	„		87 50
	„		54 00
	„		3 00
	„		60 00
	„		13 10

ESTATE OF BESSIE WALLACE.

1919.			
Sept. 5.	To Voucher	$	17 50
	„		113 70
	„		6 45
	„		60 09
	„		43 65
	„		5 00
	„		6 00
Dec. 3.	„		1 00

ESTATE OF VICTOR R. SWANSON.

1919.			
Feb. 10.	To Voucher	$	237 70
	„		7 00
Feb. 25.	„		10 00

ESTATE OF THOMAS G. SLOAN.

1919.			
Jan. 9.	To Voucher	$	13 75
Feb. 10.	„		4 43
Feb. 20.	„		32 30
	„		18 55
Mar. 7.	„		7 00
	„		10 89
April 5.	„		40 42
April 25.	„		11 00
	„		62 30
	„		31
	„		20 00
	„		22 00
	„		23 50
	„		2 93
	„		2 00
April 29.	„		477 15
	„		30 00
	„		1 15
May 7.	„		94
June 4.	„		15 06
June 12.	„		1 87
Aug. 11.	„		2 60
Oct. 17.	„		1 25
Oct. 26.	„		55 00
	„		3 50
Dec. 3.	„		2 90
	„		4 00
Dec. 6.	„		45 00
	Hazelton Hospital		66 00

CR.

ESTATE OF GEORGE A. REEDER.

1919.			
July 14.	By A. J. Thompson	$	18 25
	Paul M. French		18 25
	James Darby		18 25
	A. J. Thompson		18 25

ESTATE OF RAMOND W. SHAW.

1919.			
Nov. 19.	By Constable Cline	$	14 00

ESTATE OF BERT SCHOOLING.

1919.			
Dec. 13.	By Union Bank of Canada	$	10 00

ESTATE OF CHARLES H. SPENCER.

1919.			
Jan. 24.	By Constable Evans	$	24 75

ESTATE OF ALONZO WILSON STULTS.

1919.			
Jan. 18.	By Mrs. A. M. Stults	$	50 25
July 19.	„ „		6 60

ESTATE OF ALBERT SOMERVILLE.

1919.			
July 11.	By Constable Robinson	$	7 50

ESTATE OF BESSIE WALLACE.

1919.			
July 23.	By J. M. Govans	$	350 00
Oct. 17.	District Land Registrar, refund		1 10

ESTATE OF VICTOR R. SWANSON.

1919.			
Jan. 16.	By P. T. Adams	$	249 50

ESTATE OF THOMAS G. SLOAN.

1919.			
Jan. 6.	By Wm. Hanna	$	10 00
Jan. 15.	W. H. Sherman		13 75
	„		35 00
	Angus McLeod		30 00
Feb. 20.	Union Bank of Canada		205 66
Feb. 25.	G.T.P. Rly. Co.		8 32
	Union Bank of Canada		4 00
Mar. 3.	N. P. Moran		71 00
Mar. 6.	E. Dawson		3 00
Mar. 8.	Mrs. F. Smith		1 00
	E. E. Doolittle		1 50
Mar. 12.	Mrs. Hollinger		1 50
Mar. 13.	Mrs. G. Raymond		2 00
Mar. 31.	Manfg. Life Insurance		708 45
April 10.	G. V. Novington		3 00
April 14.	Geo. Katsuro		1 15
May 5.	E. Hann		12 00
May 7.	J. Kennedy		2 70
May 20.	B. Gonyer		1 00
May 30.	H. C. Wrinch		59 75
May 31.	R. S. Sargent		240 49
June 3.	L. B. Warner		19 50
	Smithers School		15 00
June 4.	„ „		3 00
July 2.	Soldier Settlement		50 00
July 11.	L. L. Devoin		2 00
Sept. 4.	W. H. Sherman		25 00
Oct. 17.	„		3 00
Oct. 23.	J. N. Carr		3 00
Nov. 28.	W. H. Sherman		52 00

Dr.			Cr.		
Estate of Henry Ward.			**Estate of Henry Ward.**		
1919.			1919.		
Feb. 10.	To Voucher	$ 4 08	Jan. 10.	By C. Hertel, cabin	$ 35 00
July 12.	„	10 17			
Estate of Louis Wester.			**Estate of Louis Wester.**		
1919.			1919.		
Aug. 11.	To Voucher	$ 2 12	July 8.	By Cash among effects	$ 42 55
Oct. 17.	„	1 34	Sept. 4.	J. L. Hatch	26 87
Estate of Robert Wright.			**Estate of Robert Wright.**		
1919.			1919.		
Dec. 6.	To A. E. Phillips, funeral	$ 65 00	Dec. 4.	By Cash on body	$ 5 00
				R. S. Sargent	23 07
				„	250 00
				T. Eaton & Co.	13 15
			Dec. 17.	Refund of P.R. fee	2 00

STEPHEN H. HOSKINS,
Official Administrator.

CARIBOO ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
Estate of James Boyce.			**Estate of James Boyce.**		
1919.			1919.		
Sept. 10.	To E. J. Avison	$ 25 00	Sept. 6.	By Adjusting entry (ordered by Auditor)	$ 5 00
Estate of John L. B. McLean.					
1919.					
Sept. 8.	To Entry to balance with Treasury (ordered by Auditor)	$ 5 00			
Estate of Fulton Treen.					
1919.					
July 14.	To Taxes	$ 7 66			
Estate of T. J. Broadhead.					
1919.					
Jan. 16.	To W. A. Rae	$ 10 00			
	Official Administrator	25 00			
	E. J. Avison	85 25			
Jan. 21.	J. M. Broadhead	5 30			
Estate of Angus McPhail.			**Estate of Angus McPhail.**		
1919.			1919.		
Mar. 21.	To E. J. Avison	$ 19 10	April 5.	By Sale of effects	$ 10 00
April 5.	Official Administrator	50			
June .	Deputy Mining Recorder	5 00			
Aug. 19.	Royal Bank	3 85			
Estate of Edwin Perkins.			**Estate of Edwin Perkins.**		
1919.			1919.		
Nov. 24.	To Official Administrator	$ 1 25	Oct. 7.	By Option on claim	$ 25 00
Dec. 17.	Cariboo "Observer"	10 08		Cash	15 00
Estate of J. A. Micks.			**Estate of J. A. Micks.**		
1919.			1919.		
June 16.	To Official Administrator	$ 8 70	May 8.	By Sale of property	$ 174 10
July 25.	W. Wadsworth	160 00	July 28.	„ „	522 40
July 28.	G. J. Duncan	35 00			
Aug. 21.	Official Administrator	26 12			
Sept. 11.	Taxes	39 60			
Oct. 3.	E. J. Avison	126 35			
Estate of A. Barlow.					
1919.					
Mar. 25.	To E. J. Avison	$ 17 50			
Estate of A. W. Safken.			**Estate of A. W. Safken.**		
1919.			1919.		
Jan. .	To Telegrams	$ 75	Mar. 3.	By Sale of realty	$ 325 00
Feb. 27.	Cariboo "Observer"	2 60			
	E. J. Avison	30 00			
April 5.	Official Administrator	16 25			
Estate of Ansten Christiansen.			**Estate of Ansten Christiansen.**		
1919.			1919.		
Nov. 4.	To Government Agent	$ 10 00	Nov. .	By Sale of realty	$ 74 75
	Registrar, County Court	2 00			

DR.

ESTATE OF J. E. BOUCHER.

1919.			
Aug. 21.	To Official Administrator	$	1 04

ESTATE OF EDWARD KESSER.

1919.			
Feb. 26.	To E. J. Avison	$	33 35

ESTATE OF A. BESSETT.

1919.			
Feb. 6.	To Official Administrator	$	47
June 17.	D. F. M. Perkins		1 00

ESTATE OF U. PELLETIER.

1919.			
Jan. 22.	To Official Administrator	$	28
June 17.	D. F. M. Perkins		1 00

ESTATE OF FELIX SAPAPSKY.

1919.			
	To J. Bourne	$	1 50

ESTATE OF JOHN SINN.

1919.			
Jan. 14.	To H. H. Spencer	$	300 00
Jan. 22.	Official Administrator		7 90
Jan. 24.	Recorder of Brands		1 00
Feb. 6.	Official Administrator		75
April 5.	„		75
May 12.	„		75
May 13.	H. H. Spencer		150 00
June 14.	Provincial Assessor		176 66
June 16.	Royal Bank, payment to heir		101 25
June 17.	H. H. Spencer		150 00
Aug. 21.	Official Administrator		61
Sept. 30.	Jas. Murphy		137 90
	E. J. Avison		30 50
June 13.	E. C. Lunn		75
June 23.	„		75

ESTATE OF EMMA MOEBUS.

1919.			
Jan. 22.	To Official Administrator	$	65
Feb. 26.	Registrar, County Court ...		1 21
Mar. 21.	E. J. Avison		36 70
April 5.	Official Administrator		14 94
April 14.	D. Corless		100 00
June 16.	Official Administrator		3 80
June 17.	D. F. M. Perkins		7 50
July 28.	D. Corless		125 00
Nov. 25.	Dr. W. D. Lyons		4 00
	Connaught Hospital		53 50
	E. W. Prochnau		40 47

ESTATE OF H. C. PARSONS.

1919.			
Jan. 22.	To Official Administrator	$	7 19
June 16.	D. F. M. Perkins		3 00
Nov. 24.	Official Administrator		1 16
	D. Corless		150 00
	E. J. Avison		5 00

ESTATE OF A. H. MELQUIST.

1919.			
Jan. 22.	To Official Administrator	$	75
June 16.	„		78

ESTATE OF P. GIARDINI.

1919.			
Feb. 6.	To Official Administrator	$	3 71

ESTATE OF H. A. LARMORE.

1919.			
Jan. 18.	To Royal Bank, balance on car	$	158 25
	Official Administrator		15 50
	H. G. Windt		65 50
July 17.	C. H. Allison		3 50
	Cariboo "Observer"		9 00
	Auxiliary Hospital		30 00
	E. J. Avison		28 25

ESTATE OF T. J. WILLIAMS.

1919.			
Jan. 22.	To Official Administrator	$	16 78
Feb. 26.	Registrar, County Court ...		47 20
	E. J. Avison		52 60
	King's Printer		8 00
Mar. .	Official Administrator		172 85
	„		63 08
June 14.	D. Corless		250 00
June 17.	D. F. M. Perkins		20 00
July 14.	Connaught Hospital		49 50
July 18.	Official Administrator		4 20
Sept. 26.	Royal Bank, for transfer to Scotland		8 40
Dec. 8.	Williams & Manson		8 50

CR.

ESTATE OF J. E. BOUCHER.

1919.			
July 23.	By Sale of effects	$	20 75

ESTATE OF A. BESSETT.

1919.			
Jan. 27.	By Sale of effects	$	9 50

ESTATE OF JOHN SINN.

1919.			
Feb. 4.	By Cash	$	15 00
Mar. 5.	„		15 00
April 10.	„		15 00
May 8.	„		15 00
July 28.	„		12 25

ESTATE OF EMMA MOEBUS.

1919.			
Mar. 11.	By Insurance Co.	$	298 80
May 5.	Bank account		76 07

ESTATE OF H. C. PARSONS.

1919.			
Oct. 24.	By Standard Trust Co.	$	23 34

ESTATE OF A. H. MELQUIST.

1919.			
May 29.	By Sale of effects	$	15 75

ESTATE OF P. GIARDINI.

1919.			
Jan. 14.	By Government Agent, Fort Fraser	$	74 31

ESTATE OF H. A. LARMORE.

1919.			
Jan. .	By Hospital	$	10 00
	Sale of effects		300 00

ESTATE OF T. J. WILLIAMS.

1919.			
Jan. 20.	By Bank of Commerce	$	1,261 67
Feb. 1.	Union Bank		3,457 04
June 27.	Post-office		84 00

DR.

ESTATE OF CHOW WILLIAMS SUN.

1919.			
Jan. 22.	To Official Administrator	$	2 80
Feb. 1.	Telegrams		2 25
Feb. 26.	Stock-taking		50 00
Feb. 27.	Cariboo "Observer"		4 00
	A. S. Vaughan		5 00
Mar. 6.	Official Administrator		1 73
Mar. 21.	Probate		11 22
May 12.	Official Administrator		5 00
June 11.	E. J. Avison		49 60
Sept. 4.	Official Administrator		37 50
Sept. 11.	„		202 97
	E. J. Avison		60 00
	Chow Sip Poy		508 63

ESTATE OF C. A. GREGG.

1919.			
Nov. 24.	To Official Administrator	$	2 97

ESTATE OF LEE ESTES.

1919.			
Feb. 6.	To Official Administrator	$	39

ESTATE OF D. NILSON.

1919.			
Feb. 6.	To Official Administrator	$	1 17
April 5.	„		15 20
	E. J. Avison		34 45
June 17.	D. F. M. Perkins		7 50
July 29.	D. Corless		100 00
Sept. 8.	Registrar, county Court		11 76
Nov. 21.	D. Corless		50 00
	A. King		8 00

ESTATE OF C. HENDRICKSEN.

1919.			
Feb. 6.	To Official Administrator	$	1 12
May 13.	„		23 29
	E. J. Avison		43 95
June 16.	Official Administrator		12 86
July 29.	Registrar, County Court		7 52
Dec. 30.	Standard Trust Co.		656 86

ESTATE OF A. KJETSAA.

1919.			
Mar. 3.	To Official Administrator	$	2 91
June 17.	D. F. M. Perkins		2 50
Sept. 16.	Registrar, County Court		58
Oct. 16.	Official Administrator		10 55
Nov. 21.	E. J. Avison		31 45

ESTATE OF GORDON THOMPSON.

1919.			
Mar. 3.	To Official Administrator	$	45
Sept. 8.	Registrar, County Court		1 98
Oct. 16.	Official Administrator		12 14
Nov. 21.	E. J. Avison		20 00

ESTATE OF WILLIAM JOHNSON.

1919.			
Mar. 3.	To Official Administrator	$	5 00
June 13.	Cariboo "Observer"		4 80
June 14.	Assessor		71 52
July 18.	Official Administrator		10 00
July 24.	Royal Bank, payment on pre-emption record		203 31

ESTATE OF M. MARKESON.

1919.			
April 5.	To Official Administrator	$	1 61

ESTATE OF HELEN MEHAFFEY.

1919.			
Mar. 3.	To Royal Bank	$	45 25
	„		75 00
	Official Administrator		12 52
	E. J. Avison		18 20
	Mrs. J. Boyd		7 50
	Cariboo "Observer"		1 25
	J. A. Fraser, Ltd.		1 50
	Mrs. J. Thompson		9 50
	C. S. Smythe		7 50
	C. Smith		2 50
	C. Broughton		13 10
	W. H. H. Elliott		6 50
	C. H. Allison		2 60
	Cowan Supply Co.		9 35
	Quesnel Hospital		15 00
Mar. 22.	Royal Bank		20 00
April 5.	Official Administrator		15 57
April 10.	Cariboo "Observer"		1 80
	Royal Bank		20 00
May 7.	„		36 46
June 30.	„		100 00
July 17.	Dr. Baker		15 00
Sept. 11.	Royal Bank, for H. Mehaffey		25 00
	Registrar, County Court		92
Sept. 23.	Royal Bank for H. Mehaffey		99 91

CR.

ESTATE OF CHOW WILLIAMS SUN.

1919.			
Jan. 14.	By Bank	$	34 60
April 30.	S. N. William & Co.		100 00
Aug. 20.	„ „		750 00

ESTATE OF C. A. GREGG.

1919.			
Oct. 25.	By W. J. Brennan	$	59 73

ESTATE OF LEE ESTES.

1919.			
Jan. 27.	By Police	$	7 85

ESTATE OF JOHN HEILMAN.

1919.			
Dec. 30.	By Bank, Prince George	$	40 13

ESTATE OF D. NILSON.

1919.			
Jan. 30.	By Personal effects	$	23 35
	N. Lumber Co.		52 80
	Bank		251 25

ESTATE OF C. HENDRICKSEN.

1919.			
Jan. 30.	By Sale of effects	$	22 45
	Bank		465 83
	„		257 32

ESTATE OF A. KJETSAA.

1919.			
Feb. 6.	By Sale of effects	$	58 20
Sept. 30.	Bank		211 00

ESTATE OF GORDON THOMPSON.

1919.			
Feb. 6.	By Sale of effects	$	9 00
	Bank		242 90

ESTATE OF WILLIAM JOHNSON.

1919.			
Feb. 25.	By Sale of realty	$	100 00
June 6.	„ „		200 00

ESTATE OF M. MARKESON.

1919.			
Mar. 10.	By Provincial Police	$	32 25

ESTATE OF HELEN MEHAFFEY.

1919.			
Feb. 4.	By Patriotic Fund and Militia and Defence	$	164 50
Feb. 10.	Militia and Defence		78 00
	Patriotic Fund		8 00
Mar.	Bank		311 43

DR.

ESTATE OF A. DOW.

1919.			
April 5.	To Official Administrator	$	2 57
April 11.	J. Bourne		50
July 18.	Official Administrator		6 00

ESTATE OF A. MCKINLEY.

1919.			
April 5.	To Official Administrator	$	7 83
April 11.	J. Bourne		50
Sept. 10.	E. J. Avison		14 50
Oct. 27.	Royal Bank for Griesbach & O'Connor		132 17

ESTATE OF M. MUNRO.

1919.			
April 5.	To Official Administrator	$	6 74
April 11.	J. Bourne		50

ESTATE OF PETE BELINSKY.

1919.			
April 5.	To Official Administrator	$	23 95
May 13.	Constable Tame		5 00
Sept. 10.	E. J. Avison		38 50
Oct. 16.	Official Administrator		10 46

ESTATE OF ANDREW COBER.

1919.			
May 12.	To Official Administrator	$	18 43
June 13.	King's Printer		5 00
June 16.	Bulletin Co.		15 00
	Assessor		9 00
	Constable Duncan		1 00
July 18.	Official Administrator		6 78
July 23.	Constable Duncan		5 00
Sept. 4.	Official Administrator		21 38
Sept. 8.	"		14 24
Nov. 21.	Oliver Cober		150 00

ESTATE OF T. ROSS.

1919.			
May 12.	To Official Administrator	$	1 48
Aug. 19.	E. J. Avison		25 00

ESTATE OF WILLIAM GIBB.

1919.			
Sept. 4.	To Official Administrator	$	25 00
Oct. 28.	E. J. Avison		58 10
Dec. 15.	Mrs. M. Gibb		415 40

ESTATE OF JAMES MCDONALD.

1919.			
May 12.	To Official Administrator	$	82
July 18.	"		78
Sept. 4.	"		5 82
Dec. 19.	E. J. Avison		5 00
	F. M. Becher		7 35
	Chilcotin Trading Co.		55 45
	John Stewart		14 00
	A. W. Haddock		15 00
	Dr. Wright		35 00

ESTATE OF JAMES CUMMING.

1919.			
May 12.	To Official Administrator	$	3 69
Oct. 16.	"		75

ESTATE OF WILLIAM ISNARDY.

1919.			
Sept. 4.	To Official Administrator	$	1 25

ESTATE OF C. HOEBECK.

1919.			
July 18.	To Official Administrator	$	3 80
Nov. 24.	E. J. Avison		5 00
	Indian Annie		5 00
	Louis Thomas		5 00
	G. Bell		2 00
	S. G. Marwick		30 00
	E. Fraser		10 00
	T. T. Weyenburg		5 00

ESTATE OF ALBERT SOMERVILLE.

1919.			
July 18.	To Official Administrator	$	3 70
July 22.	Registrar, County Court		1 00
Sept. 8.	" "		138 50
Sept. 16.	Prince George "Citizen"		2 64
Oct. 28.	E. J. Avison		43 30
	Telegrams		4 50

NOTE.—This estate turned over to Mr. Hoskins, Official Administrator at Smithers.

ESTATE OF CHAS. T. WINTERS.

1919.			
Aug. 21.	To Official Administrator	$	3 54

CR.

ESTATE OF A. DOW.

1919.			
Mar. 13.	By Carleton & Fletter	$	51 48
	Provincial Police		120 00

ESTATE OF A. MCKINLEY.

1919.			
Mar. 13.	By Carleton & Fletter	$	156 65

ESTATE OF M. MUNRO.

1919.			
Mar. 13.	By Carleton & Fletter	$	134 96

ESTATE OF PETE BELINSKY.

1919.			
Mar. 13.	By Railway Co., wages	$	479 11
Sept. 30.	Sale of bonds		209 30

ESTATE OF ANDREW COBER.

1919.			
April 4.	By Police	$	368 65
June 16.	Sale of effects		135 70
Aug. 1.	Bank		427 66

ESTATE OF T. ROSS.

1919.			
April 1.	By R. Ross	$	29 75

ESTATE OF WILLIAM GIBB.

1919.			
Aug. 27.	By Sale of realty	$	500 00

ESTATE OF JAMES MCDONALD.

1919.			
April 10.	By Sale of effects	$	6 35
April 17.	" "		10 00
June 16.	J. Murphy		15 75
Aug. 19.	Sale of effects		116 45
Dec. 18.	" "		17 25

ESTATE OF JAMES CUMMING.

1919.			
April .	By Proceeds of sale	$	39 20
Sept. .	Dr. Herald		15 00

ESTATE OF WILLIAM ISNARDY.

1919.			
Aug. 19.	By Mrs. McKill	$	25 00

ESTATE OF C. HOEBECK.

1919.			
June 16.	By Sale of effects	$	76 15

ESTATE OF ALBERT SOMERVILLE.

1919.			
June 16.	By Government Agent at Fort Fraser	$	73 97
	Bank		2,684 13

ESTATE OF CHAS. T. WINTERS.

1919.			
July 2.	By Pay-cheques	$	69 35
	Cash		1 60

Dr.			Cr.		
Estate of Wm. McLennan.			**Estate of Wm. McLennan.**		
1919.			1919.		
Sept. 4. To Official Administrator		$ 1 24	Aug. 25. By Christie Bros. *re* property		$ 24 75
Estate of Harry Holtmeyer.			**Estate of Harry Holtmeyer.**		
1919.			1919.		
Oct. 16. To Official Administrator		$ 22 89	Sept. 30. By Provincial Police		$ 457 85
Dec. 15. E. J. Avison		34 20			
Estate of John Spencer.			**Estate of John Spencer.**		
1919.			1919.		
Oct. 16. To Official Administrator		$ 1 74	Sept. 23. By Sale of effects		$ 34 75
			Nov. 25. Interest on bonds		13 75
			Estate of Robert Gardner.		
			1919.		
			Dec. 21. By Sale of effects		$ 84 50

EDGAR C. LUNN,
Official Administrator.

SKEENA RIVER AND QUEEN CHARLOTTE MINING DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

Dr.			Cr.		
Estate of Harry McNeill.			**Estate of Harry McNeill.**		
1919.			1919.		
Dec. 31. To Assessor, taxes	$ 7 20		Dec. 31. By Sale of Lot 1101, Range 5		$ 800 00
Government Agent	256 20				
Administrator, commission	40 00				
Estate of William D. Black.					
1919.					
Dec. 31. To Assessor, taxes	$ 1 15				
Estate of J. and R. Johnson.					
1919.					
Dec. 31. To Assessor, taxes	$ 1 86				
" "	33 49				
Estate of John Herstick.					
1919.					
Dec. 31. To Collector, North Vancouver	$ 7 22				
Assessor, taxes	11 00				
Estate of E. M. Haynes.			**Estate of E. M. Haynes.**		
1919.			1919.		
Dec. 31. To Administrator, commission	$ 10 30		Dec. 31. By Second payment, Lot 1430, J. Young		$ 206 00
Distributed to heirs	265 92		Third payment, Lot 1430, J. Young		372 00
Estate of T. Torseenson.			**Estate of T. Torseenson.**		
1919.			1919.		
Dec. 31. To Administrator, commission	$ 5 42		Dec. 31. By Sale of Lot 1918, Range 5		$ 300 00
Patmore & Fulton	41 95				
Administrator, commission	15 00				
"Daily News"	6 00				
George Little	79 46				
S. Sjostrand	29 25				
Fred Nelson	6 00				
L. H. Kenny	20 00				
F. Lazelle	1 75				
B.C. Nurseries	38 85				
Dan Clacher	25 05				
Knute Olson	43 00				
A. L. Grider	1 00				
J. K. Gordon	20 65				
Patmore & Fulton	5 00				
Estate of J. B. Barnaichez.			**Estate of J. B. Barnaichez.**		
1919.			1919.		
Dec. 31. To Administrator, commission	$ 5 62		Dec. 31. By R. M. Stewart, note		$ 112 50
Assessor, taxes	8 10		Sale of Stewart land		249 65
Administrator, commission	12 48				
Estate of D. J. Rainey.			**Estate of D. J. Rainey.**		
1919.			1919.		
Dec. 31. To Administrator, commission	$ 44 00		Dec. 31. By Dividend, Salmon Bear River Co.		$ 154 00
District Registrar	1 00		Dividend, Salmon Bear River Co.		572 00
Free miner's certificate	5 00				
Gold Commissioner	102 50				
F. P. Rainey	800 00				

DR.

ESTATE OF C. GIBSON.

1919.			
Dec. 31.	To District Registrar	$	1 00
	Residue to heirs		805 81

ESTATE OF S. F. STEBBINS.

1919.			
Dec. 31.	To Assessor, taxes	$	57 44
	"Daily News"		29 10

ESTATE OF L. CAMANDINI.

1919.			
Dec. 31.	To District Registrar	$	1 00
	Consul-General for Italy		408 11

ESTATE OF SANTO PASUT.

1919.			
Dec. 31.	To Italian Consul-General	$	736 52

ESTATE OF JAMES DACK.

1919.			
Dec. 31.	To Matthew Dack	$	700 00
	Assessor, taxes		18 00

ESTATE OF AMIE RENNIE.

1919.			
Dec. 31.	To Granby Co.	$	53 50
	District Registrar		2 00
	Administrator, commission		41 82
	Residue to heirs		1,834 89

ESTATE OF JAMES GOFF.

1919.			
Dec. 31.	To Annie Goff	$	29 12

ESTATE OF R. CAPETO.

1919.			
Dec. 31.	To Pacific Mills, funeral	$	35 52

ESTATE OF TANAKA NAOKICHI.

1919.			
Dec. 31.	To Administrator, commission	$	5 70
	Probate		5 53
	Patmore & Fulton		29 75
	"Daily News"		5 40
	District Registrar		1 00
	Consul for Japan		66 77

ESTATE OF HERMAN MCKINNON.

1919.			
Dec. 31.	To Ormes, Limited	$	4 25
	P.R. Hospital		5 20
	District Registrar		1 00
	Probate		8 37
	Haynor Bros.		75 06

ESTATE OF JOHN CARLSON.

1919.			
Dec. 31.	To C. A. Eggert, M.D.	$	9 00
	Administrator, commission		39 14
	Williams & Manson		37 20
	Probate		39 19

ESTATE OF CARL R. CARLSON.

1919.			
Dec. 31.	To Probate	$	8 35
	Dr. McNeill		12 00
	Patmore & Fulton		44 95
	Administrator, commission		32 41
	District Registrar		1 00
	"Daily News"		5 80
	Haynor Bros.		135 00

ESTATE OF V. ROSSIE.

1919.			
Dec. 31.	To Prince Rupert Hospital	$	14 00
	District Registrar		1 00
	L. Mazzie		82 00
	Administrator, commission		10 55

ESTATE OF JAMES W. WATT.

1919.			
Dec. 31.	To J. J. Alexander	$	139 00
	Administrator, commission		14 67
	District Registrar		3 00
	Consular fees		2 50
	Dr. McNeill		32 00
	Probate		5 52
	M. B. Watt		156 68

CR.

ESTATE OF S. F. STEBBINS.

1919.			
Dec. 31.	By sale of Lot 16, Bk. 39, Sec. 7, P.R.	$	285 00

ESTATE OF AMIE RENNIE.

1919.			
Dec. 31.	By I.O.F. policy	$	786 44
	I.O.F. funeral benefit		50 00
	Sale of trunk		10 00

ESTATE OF JAMES GOFF.

1919.			
Dec. 31.	By Bank of Commerce	$	29 12

ESTATE OF JOHN POST.

1919.			
Dec. 31.	By B. Davidson, note	$	640 00

ESTATE OF JOHN CARLSON.

1919.			
Dec. 31.	By Taylor Engineering Co.	$	731 27

ESTATE OF CARL R. CARLSON.

1919.			
Dec. 31.	By Bank of Commerce	$	600 00
	Liberty bond		48 34

ESTATE OF V. ROSSIE.

1919.			
Dec. 31.	By Sale of two Victory Bonds and coupons	$	210 00

ESTATE OF JAMES W. WATT.

1919.			
Dec. 31.	By Sale of Victory bonds	$	293 50

DR.

ESTATE OF ISAAC CVJETKOVICH.

1919.			
Dec. 31.	To B.C. Undertakers	$	100 00
	Prince Rupert Hospital		2 45
	Administrator, commission		2 12
	District Registrar		3 00
	Probate		2 78

ESTATE OF EMANUEL SINCLAIR.

1919.			
Dec. 31.	To District Registrar	$	1 00
	C. Sinclair		117 20

ESTATE OF G. ARNASON.

1919.			
Dec. 31.	To Patmore & Fulton	$	5 00
	"Daily News"		6 00
	B.C. Undertakers		100 00
	District Registrar		4 00
	Administrator, commission		27 90
	99 Taxi		1 00
	Danish Consul		2,507 76

ESTATE OF GUISEPPE CORRADO.

1919.			
Dec. 31.	To "Daily News"	$	6 00
	Haynor Bros.		175 00
	Italian Consul		200 00
	L. Mazzie		27 25
	Administrator, commission		21 23

ESTATE OF FO. CARBONI.

1919.			
Dec. 31.	To Haynor Bros.	$	100 00
	Prince Rupert Hospital		13 50
	L. Mazzie		15 00
	"Daily News"		5 80
	District Registrar		1 00
	Consul-General for Italy		266 81

ESTATE OF ARNI HANNESSON.

1919.			
Dec. 31.	To B.C. Undertakers	$	100 00
	Prince Rupert Hospital		2 15
	"Daily News"		5 80
	District Registrar		5 00

ESTATE OF DAN MCMILLAN.

1919.			
Dec. 31.	To Administrator, commission	$	2 62
	"Daily News"		5 80
	B.C. Undertakers		125 00
	District Registrar		1 00
	H. L. McMillan		588 00

ESTATE OF TOMO MUNIZABE.

1919.			
Dec. 31.	To Administrator, commission	$	56 50
	Vida Munizabe		250 00
	C. A. Eggert, M.D.		50 00
	Patmore & Fulton		30 00
	"Daily News"		5 80
	Third Avenue Cash Meat Market		205 25
	Mussallem Grocery		14 05
	Haynor Bros.		200 00

ESTATE OF CATHERINE S. GLENDENNING.

1919.			
Dec. 31.	To Probate	$	5 15
	Administrator, commission		10 15
	B.C. Undertakers		100 00
	Patmore & Fulton		31 95
	"Daily News"		6 00
	District Registrar		1 00

ESTATE OF JOHN N. MORRISON.

1919.			
Dec. 31.	To Administrator, commission	$	19 10
	Probate		3 37
	B.C. Undertakers		200 00
	Ormes, Limited		10 05
	Patmore & Fulton		39 95
	"Daily News"		5 80
	Prince Rupert Hospital		27 50
	Empire Publishing Co.		3 00
	District Registrar		3 00
	F. Somers		30 00

CR.

ESTATE OF ISAAC CVJETKOVICH.

1919.			
Dec. 31.	By Canadian Fish & Cold Storage	$	38 68
	Royal Bank		3 87

ESTATE OF G. ARNASON.

1919.			
Dec. 31.	By Sale of Smith Island lot	$	250 00
	Bank of Hamilton		308 00

ESTATE OF GUISEPPE CORRADO.

1919.			
Dec. 31.	By Royal Bank	$	8 71
	Taylor Engineering Co.		424 70

ESTATE OF JOHN N. MORRISON.

1919.			
Dec. 31.	By City Treasurer	$	94 70
	Interest on Victory bond		5 50
	Sale of Victory bond		99 83
	Sale of skiff		50 00
	F. Somers		30 00

DR.

ESTATE OF CHARLES SWANSON.

1919.			
Dec. 31.	To Mining Recorder	$ 2	50
	Probate	10	02
	L. Broe, M.D.	8	50
	Patmore & Fulton	39	95
	Administrator, commission	128	63
	"Daily News"	5	80
	O. Evindsen	95	21
	Granby Co.	267	10
	District Registrar	2	00
	G. W. Bruggy	12	45
	Patmore & Fulton	13	00
	Free miner's certificate	5	00
	Johnston & Hamilton	62	50
	F. A. Swanson	50	00
	Mining Recorder, Anyox	107	50
	C. G. Fee, Black Bear M.C.	25	00
	A. Miner	25	00

ESTATE OF E. CARLSON.

1919.			
Dec. 31.	To L. Broe, M.D.	$ 10	50
	Administrator, commission	538	03
	Patmore & Fulton	49	95
	"Daily News"	5	60
	District Registrar	2	00
	Granby Hospital	14	20
	Free miner's certificate	5	00

ESTATE OF JOHN VEALE.

1919.			
Dec. 31.	To Probate	$ 175	39
	Administrator, commission	180	13
	Terrace Hospital	30	50
	T. J. Kirkpatrick	10	00
	H. A. Swain	5	00
	Kitsumgallum Cemetery	11	00
	"Daily News"	6	00
	District Registrar	7	00
	Assessor, taxes	12	60
	Patmore & Fulton	62	20
	Patrick Veale	3,100	64

ESTATE OF OSCAR MAGNUSSON.

1919.			
Dec. 31.	To Administrator, commission	$ 5	60
	C. A. Eggert, M.D.	18	00

ESTATE OF AUGUST ROSS.

1919.			
Dec. 31.	To Patmore & Fulton	$ 38	00
	Administrator, commission	3	93

ESTATE OF JOSEPH RIZATTO.

1919.			
Dec. 31.	To Probate	$ 174	15
	Patmore & Fulton	39	95
	Administrator, commission	174	15
	"Daily News"	6	00
	District Registrar	1	00

ESTATE OF H. R. CHRISTENSON.

1919.			
Dec. 31.	To Administrator, commission	$ 84	09
	Probate	7	35
	"Daily News"	5	40
	Patmore & Fulton	44	95
	District Registrar	2	00
	Free miner's certificate	5	00
	A. E. Young	4	00
	L. Footman	5	00
	Consul for Norway	1,505	39

ESTATE OF JOHN BUNTING.

1919.			
Dec. 31.	To Prince Rupert General Hospital	$ 7	00
	C. A. Eggert, M.D.	33	00
	Haynor Bros.	100	00
	District Registrar	3	00
	Probate	8	03
	Patmore & Fulton	44	95
	"Daily News"	5	40
	Registrar of Births, Deaths, and Marriages	1	25
	Administrator, commission	54	22
	City Treasurer, taxes	9	34

ESTATE OF ERNEST PFALBUSCH.

1919.			
Dec. 31.	To Administrator, commission	$ 8	13
	Imperial Munitions Board	32	50
	Coulson Bros.	64	00

CR.

ESTATE OF CHARLES SWANSON.

1919.			
Dec. 31.	By Payment on bond, Bonanza Fract.	$ 38	50
	Taylor Engineering Co.	347	50
	Sale of Nancy Hanks M.C.	250	00
	Sale of cabin	250	00
	Sale of Slide and Newport M.C.	400	00
	Payment on bond, Bonanza Fract.	384	64
	Wm. Martin	20	00
	Sale of part Lot 1074	350	00
	Payment on Silver Tip M.C.	333	33

ESTATE OF E. CARLSON.

1919.			
Dec. 31.	By Sale of Lot 3643	$3,000	00
	Taylor Engineering Co.	621	24
	Sale of Summit M.C.	50	00
	Payment on bond, North Star Group	3,600	00

ESTATE OF JOHN VEALE.

1919.			
Dec. 31.	By Sale of Victory bond and interest	$1,039	62
	Sale of War Savings certificates	1,395	00

ESTATE OF H. R. CHRISTENSON.

1919.			
Dec. 31.	By P.O. savings	$ 203	50
	National Bank, Spokane	619	07
	Sale of boat	75	00
	Patmore & Fulton	356	46
	Sale of effects	40	00

ESTATE OF JOHN BUNTING.

1919.			
Dec. 31.	By Bank of Commerce	$ 756	62
	Sale of Lots 3 and 4, Bk. 26, Sec. 8; Prince Rupert	281	22

ESTATE OF ERNEST PFALBUSCH.

1919.			
Dec. 31.	By Rent of cabin	$ 2	50

DR.

ESTATE OF JOSEPH BONERO.

1919.			
Dec. 31.	To Patmore & Fulton	$	39 95
	"Daily News"		6 00
	District Registrar		2 00
	Granby Co., funeral		77 50
	Administrator, commission		142 15
	Consul-General for Italy		2,575 59

ESTATE OF PETER LYSYK.

1919.			
Dec. 31.	To Dr. Kergin	$	21 00
	B.C. Undertakers		125 00
	Patmore & Fulton		44 95
	Probate		56 22
	News Publishing Co.		5 00
	District Registrar		2 00
	Administrator, commission		62 89

ESTATE OF ANGELO ZANARDI.

1919.			
Dec. 31.	To Haynor Bros.	$	100 00
	Administrator, commission		10 10
	F. T. Bowness		14 50

ESTATE OF LARS F. FRISK.

1919.			
Dec. 31.	To B.C. Undertakers	$	100 00
	Ormes, Limited		7 25
	Dr. W. T. Kergin		72 36
	Administrator, commission		9 19

ESTATE OF ROBERT A. GRANT.

1919.			
Dec. 31.	To Bank of Commerce, balance on $500 Victory bond	$	356 23
	B.C. Undertakers		183 00
	J. Naylor, note		1,000 00
	Royal Bank, note		514 80
	Free miner's certificate		5 00
	"Daily News"		5 40
	P.R. Club		40 00
	Williams & Manson		59 70
	Assessor, South Vancouver		11 89
	District Registrar		5 00
	Pioneer Laundry		7 75
	Administrator, commission		158 40

ESTATE OF J. A. POETT.

1919.			
Dec. 31.	To Granby Co., funeral	$	80 00
	Probate		2 66
	Patmore & Fulton		36 95
	"Daily News"		5 20
	J. H. Riley		10 15
	Administrator, commission		17 81
	Mrs. Poett		158 22
	Mrs. O'Sullivan		45 21

ESTATE OF WILLIAM SAMMON.

1919.			
Dec. 31.	To Haynor Bros.	$	100 00
	Probate		33 90
	Patmore & Fulton		44 95
	News Publishing Co.		5 40
	District Registrar		1 00
	Gold Commissioner		102 50
	Assessor, taxes		12 62
	Administrator, commission		39 35

ESTATE OF JOHN A. MCCUAIG.

1919.			
Dec. 31.	To Pacific Cartage	$	1 25
	Dr. McNeill		39 00
	Administrator, commission		8 47

ESTATE OF ABRAM SARTORI.

1919.			
Dec. 31.	To Haynor Bros.	$	195 00
	A. Carss		38 50
	Probate		37 50
	District Registrar		2 00
	A. Dominato		53 00
	G. Vaccher		112 40
	P.R. Hospital		2 00
	C. A. Eggert, M.D.		45 00
	Administrator, commission		37 61

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ESTATE OF JOSEPH BONERO.

1919.			
Dec. 31.	By Sale of Victory Bond and interest	$	533 31

ESTATE OF PETER LYSYK.

1919.			
Dec. 31.	By Imperial Bank	$	883 00
	Masset timber		41 63

ESTATE OF LARS F. FRISK.

1919.			
Dec. 31.	By Hanson Tie Co.	$	97 80
	Sale of rifle		30 00
	Frank Allan		5 00

ESTATE OF MIKE DAN.

1919.			
Dec. 31.	By Cash	$	6 40

ESTATE OF C. ANTINUO.

1919.			
Dec. 31.	By Granby Co.	$	28 50

ESTATE OF ROBERT A. GRANT.

1919.			
Dec. 31.	By Cash	$	42 40
	P. Burns & Co.		162 35
	J. W. Graham, mortgage		366 70
	J. Wilson, rent		35 00
	Bank of Commerce		607 93
	Sale of Victory bonds		1,552 85
	P.R. Club, debenture interest		24 00
	Sale of Lot 2361		300 00
	Deep "C" Fisheries		611 00
	Royal Bank		21 85

ESTATE OF J. A. POETT.

1919.			
Dec. 31.	By Granby Co.	$	346 20
	Cash		10 00

ESTATE OF WILLIAM SAMMON.

1919.			
Dec. 31.	By Cash	$	160 00
	Bank of B.N.A.		627 13

ESTATE OF JOHN A. MCCUAIG.

1919.			
Dec. 31.	By Cash	$	91 00
	Imperial Munitions Board		79 83

ESTATE OF ABRAM SARTORI.

1919.			
Dec. 31.	By Royal Bank	$	300 00
	P.O. savings		452 25

DR.

ESTATE OF PIETRO GIVOTTE.

1919.			
Dec. 31.	To District Registrar	$	1 00
	Probate		32 68
	Patmore & Fulton		44 95
	"Daily News"		5 40
	Granby Co., funeral		47 50
	Administrator, commission		37 68

ESTATE OF JOHN KOSKI.

1919.			
Dec. 31.	To Probate	$	14 55
	District Registrar		1 00
	Patmore & Fulton		44 95
	"Daily News"		5 00
	Granby Co., funeral		47 50
	Administrator, commission		19 55
	Deputy Registrar, S.C.		20

ESTATE OF W. M. SUNBERG.

1919.			
Dec. 31.	To Probate	$	29 66
	Patmore & Fulton		44 95
	"Daily News"		5 80
	District Registrar		3 00
	Granby Co., funeral		34 20
	Assessor, taxes		13 50
	Exchange on Victory bond		25
	Administrator, commission		32 52

ESTATE OF YONE YAMAMOTO.

1919.			
Dec. 31.	To F. W. Chandler	$	5 00
	District Registrar		1 00
	Patmore & Fulton		44 95
	"Daily News"		5 60
	U. Suga, funeral		132 00
	Administrator, commission		21 50
	Consul for Japan		220 14

ESTATE OF MALCOLM MCKAY.

1919.			
Dec. 31.	To Probate	$	2 51
	District Registrar		1 00
	Patmore & Fulton		41 95
	"Daily News"		5 60
	Granby Co., funeral		135 00
	Administrator, commission		12 58
	Norman McKay		53 13

ESTATE OF PARTAP SINGH.

1919.			
Dec. 31.	To District Registrar	$	5 00
	Williams & Manson		59 15
	P.R. General Hospital		41 00
	Dr. McNeill		45 00
	Probate		21 55
	Bird, McDonald & Co.		2 50
	Ganda Singh		6 00
	Collector, taxes		2 16
	B.C. Undertakers		25 00
	Administrator, commission		115 47
	Patmore & Fulton, residue		1,986 66

ESTATE OF STANLEY WOZNEY.

1919.			
Dec. 31.	To Probate	$	10 70
	"Daily News"		5 40
	Patmore & Fulton		44 95
	District Registrar		1 00
	Haynor Bros.		199 06
	Administrator, commission		54 64

ESTATE OF JOHN GERSING.

1919.			
Dec. 31.	To Pacific Mills, funeral	$	109 40
	Administrator, commission		6 50

ESTATE OF A. FLORE.

1919.			
Dec. 31.	To Probate	$	17 35
	Patmore & Fulton		44 95
	News Publishing Co.		5 60
	Administrator, commission		30 78
	Consul-General for Italy		516 97

ESTATE OF DANIEL MCKAY.

1919.			
Dec. 31.	To Probate	$	25
	Patmore & Fulton		20 95
	Dr. McNeill		42 00
	News Publishing Co.		5 60
	District Registrar		1 00
	Administrator, commission		12 62

CR.

ESTATE OF PIETRO GIVOTTE.

1919.			
Dec. 31.	By Bank of Commerce	$	753 77

ESTATE OF JOHN KOSKI.

1919.			
Dec. 31.	By Union Bank	$	370 00
	Cash		21 10

ESTATE OF W. M. SUNBERG.

1919.			
Dec. 31.	By Bank of Commerce	$	208 45
	Royal Bank		373 55
	Cash		11 25
	Bank of Commerce		3 45
	Sale of Victory bond		54 13
	Sale of effects		8 50

ESTATE OF YONE YAMAMOTO.

1919.			
Dec. 31.	By Bank of Commerce	$	430 19

ESTATE OF MALCOLM MCKAY.

1919.			
Dec. 31.	By Bank of Montreal	$	251 77

ESTATE OF PARTAP SINGH.

1919.			
Dec. 31.	By Bank of Commerce	$	657 69
	Japanese & Can. Trust Savings		110 80
	Imperial Bank		1,314 75
	Bank of Montreal		202 30
	P.R. Lumber Co.		23 95

ESTATE OF STANLEY WOZNEY.

1919.			
Dec. 31.	By Cash	$	6 00
	Union Bank		1,086 98

ESTATE OF JOHN GERSING.

1919.			
Dec. 31.	By Pacific Mills	$	130 00

ESTATE OF A. FLORE.

1919.			
Dec. 31.	By Granby Co.	$	490 00
	Granby Co., wages		20 65
	Sale of Victory bond		105 00

ESTATE OF DANIEL MCKAY.

1919.			
Dec. 31.	By G.T.P., wages	$	252 46

DR.

ESTATE OF SAM FAGERLAND.

1919.			
Dec. 31.	To Probate	$	9 43
	Patmore & Fulton		44 95
	News Publishing Co.		5 00
	District Registrar		1 00
	O. J. Jacobson, funeral		156 70
	Collector, North Vancouver		4 24
	Administrator, commission		50 00
	Consul for Norway		728 79

ESTATE OF ROBERT EDWARDS.

1919.			
Dec. 31.	To Patmore & Fulton	$	39 95
	B.C. Undertakers		100 00
	"Daily News"		4 80
	District Registrar		1 00
	Lars Aas		300 00
	F. M. Davis		17 70
	Administrator, commission		30 25

ESTATE OF F. MANDAIO.

1919.			
Dec. 31.	To Probate	$	16 72
	Patmore & Fulton		44 95
	News Publishing Co.		6 00
	Pacific Mills		27 45
	Administrator, commission		85 00

ESTATE OF H. A. BREADEN.

1919.			
Dec. 31.	To Patmore & Fulton	$	41 95
	Probate		5 87
	Registrar of B.D.M.		75
	"Daily News"		5 60
	District Registrar		1 00
	Administrator, commission		31 40
	John Breaden		541 43

ESTATE OF A. J. DONOHUE.

1919.			
Dec. 31.	To B.C. Undertakers	$	200 00
	Dom. Exp., shipping body		186 76
	Patmore & Fulton		44 95
	Probate		12 43
	"Daily News"		6 00
	Assessor, taxes		61 20
	W. J. Cassidy		398 56
	Mrs. Donohue		100 00
	District Registrar		2 00
	Administrator, commission		61 01

ESTATE OF N. FISCHEN.

1919.			
Dec. 31.	To B.C. Undertakers	$	100 00
	Patmore & Fulton		36 95
	Probate		17 47
	"Daily News"		5 40
	District Registrar		1 00
	W. Reinhard, M.D.		25 00
	Administrator, commission		22 47

ESTATE OF MIKE KOSTUK.

1919.			
Dec. 31.	To Administrator, commission	$	15 95

ESTATE OF JOHN VOSILUK.

1919.			
Dec. 31.	To Administrator, commission	$	17 33

ESTATE OF PAUL OSA.

1919.			
Dec. 31.	B.C. Undertakers	$	60 00
	Probate		7 21
	Patmore & Fulton		40 05
	"Daily News"		8 10
	Administrator, commission		43 57

ESTATE OF ARTHUR DESAUTELS.

1919.			
Dec. 31.	To Patmore & Fulton	$	38 95
	Probate		16 90
	"Daily News"		5 40
	District Registrar		1 00
	Administrator, commission		16 90

ESTATE OF JOHN DARLING.

1919.			
Dec. 31.	To Patmore & Fulton	$	42 45
	"Daily News"		5 40
	Administrator, commission		18 84

CR.

ESTATE OF SAM FAGERLAND.

1919.			
Dec. 31.	By Bank of Montreal	$	1,000 11

ESTATE OF ROBERT EDWARDS.

1919.			
Dec. 31.	By Sale of boat	$	35 00
	W. J. Dunseith		450 00
	F. G. Belham		120 00

ESTATE OF F. MANDAIO.

1919.			
Dec. 31.	By Bank of Montreal	$	1,736 35

ESTATE OF H. A. BREADEN.

1919.			
Dec. 31.	By Pacific Mills	$	16 65
	Cash		30 75
	Bank of Montreal		580 60

ESTATE OF A. J. DONOHUE.

1919.			
Dec. 31.	By Cash	$	158 80
	Union Bank		935 75
	Surf Inlet Mines		125 73
	P. Donohue		20 00

ESTATE OF N. FISCHEN.

1919.			
Dec. 31.	By Cash	$	18 00
	Royal Bank		431 44

ESTATE OF MIKE KOSTUK.

1919.			
Dec. 31.	By Cash	$	27 50
	Sale of Victory bonds		291 66

ESTATE OF JOHN VOSILUK.

1919.			
Dec. 31.	By Cash	$	346 75

ESTATE OF PAUL OSA.

1919.			
Dec. 31.	By Ker & Munn Logging Co.	$	871 49

ESTATE OF ARTHUR DESAUTELS.

1919.			
Dec. 31.	By Royal Bank	$	338 14

ESTATE OF JOHN DARLING.

1919.			
Dec. 31.	By Payments, Lot 7, Bk. 29, Sec. 6, Prince Rupert	$	303 50
	Sale of tools		73 50

DR.

ESTATE OF H. MPOUTSAS.

1919.		
Dec. 31. To McTaggart & Ellis	$	3 50
Administrator, commission		18 50

ESTATE OF MARIA VERY.

1919.		
Dec. 31. To "Daily News"	$	19 50
"		5 20
Patmore & Fulton		42 45
Administrator, commission		25 09
L. E. Very		204 81
Y. Very		204 81

ESTATE OF STANLEY BARTLETT.

1919.		
Dec. 31. To Probate	$	10 86
Patmore & Fulton		31 95
"Daily News"		5 40
District Registrar		1 00
Administrator, commission		10 80

ESTATE OF W. McK. LOGAN.

1919.		
Dec. 31. To Patmore & Fulton	$	87 20
"Daily News"		23 10
District Registrar		1 00
Administrator, commission		154 50

ESTATE OF ANTI SIAKKONEN.

1919.		
Dec. 31. To District Registrar	$	1 00
Patmore & Fulton		36 95
Probate		6 68
"Daily News"		5 80
P. LaFrance, funeral		100 00
Administrator, commission		38 43
Hannah Sutonen		579 84

ESTATE OF TONY LUCICH.

1919.		
Dec. 31. To Probate	$	9 03
Williams & Manson		55 25
Dr. McNeill		27 00
"Daily News"		4 80
Sam Trocel		133 50
Administrator, commission		30 22

ESTATE OF C. T. SKJELLUM.

1919.		
Dec. 31. To "Daily News"	$	5 60
Williams & Manson		73 90
Administrator, commission		20 00
Anna Skjellum		300 70

ESTATE OF JOSEPH BROWN.

1919.		
Dec. 31. To Administrator, commission	$	2 50

ESTATE OF ALBERT COLE.

1919.		
Dec. 31. To District Registrar	$	1 00
Probate		25 44
Patmore & Fulton		77 85
"Daily News"		5 40
Administrator, commission		26 83

ESTATE OF LARS O. THUNE.

1919.		
Dec. 31. To District Registrar	$	2 00
Patmore & Fulton		44 95
"Daily News"		5 40
Probate		13 47
Administrator, commission		67 38
Consul for Norway		1,214 46

1919. ESTATE OF C. W. SHAIRLIN.

Dec. 31. To Assessor, taxes	$	96 94
"Daily News"		16 00
Patmore & Fulton		5 00
Administrator, commission		7 50

1919. ESTATE OF G. JOHANNSSON.

Dec. 31. To Probate	$	10 78
B.C. Undertakers		100 00
Dr. Kergin		18 00
Williams & Manson		49 85
"Daily News"		5 80
District Registrar		2 00
Administrator, commission		61 17

CR.

ESTATE OF H. MPOUTSAS.

1919.		
Dec. 31. By Workmen's Compensation Board	$	18 77
Taylor Engineering Co.		351 29

ESTATE OF MARIA VERY.

1919.		
Dec. 31. By Bank of Commerce	$	501 86

ESTATE OF STANLEY BARTLETT.

1919.		
Dec. 31. By Cash	$	3 85
N. Pacific Logging Co.		212 30
Official Administrator, Vancouver		64 95

ESTATE OF W. McK. LOGAN.

1919.		
Dec. 31. By Salmon Bear River Mining Co., dividend	$	3,090 00

ESTATE OF ANTI SIAKKONEN.

1919.		
Dec. 31. By Bank of Montreal	$	768 70

ESTATE OF TONY LUCICH.

1919.		
Dec. 31. By Bank of Montreal	$	604 50

ESTATE OF C. T. SKJELLUM.

1919.		
Dec. 31. By Balance of payment, Lot 19, Bk. 23, Sec. 5, P.R.	$	400 20

ESTATE OF JOSEPH BROWN.

1919.		
Dec. 31. By Payment, Lot 1701, R. 5	$	50 00

ESTATE OF ALBERT COLE.

1919.		
Dec. 31. By Bank of Nova Scotia	$	536 89

ESTATE OF LARS O. THUNE.

1919.		
Dec. 31. By Royal Bank	$	1,142 86
Pacific Mills		204 80

1919. ESTATE OF TONY RADOVICH.

Dec. 31. By Taylor Engineering Co.	$	385 25

1919. ESTATE OF C. W. SHAIRLIN.

Dec. 31. By Sale of logs	$	150 00
Sale of N. ½ Lot 978, R. 5		800 00

1919. ESTATE OF G. JOHANNSSON.

Dec. 31. By Union Bank	$	963 53
Sale of Icelandis S.S. Co. shares		260 00

DR.

ESTATE OF CARL HANSON.

1919.			
Dec. 31.	To Administrator, commission	$	2 09
	Otto Hanson		39 71

ESTATE OF GEORGE LELADAKIS.

1919.			
Dec. 31.	To Probate	$	2 09
	"Daily News"		6 20
	Patmore & Fulton		25 95
	District Registrar		2 00
	Administrator, commission		14 36

ESTATE OF LOUIS DIXON.

1919.			
Dec. 31.	To Administrator, commission	$	2 50

ESTATE OF WM. CROSBIE.

1919.			
Dec. 31.	To B.C. Undertakers	$	125 00
	Patmore & Fulton		25 95
	Probate		3 35
	"Daily News"		5 80
	District Registrar		2 00
	Administrator, commission		21 48
	Dr. Page		56 81
	Dr. Kergin		94 66
	Geo. Frizzell		94 66

ESTATE OF MARGARET A. LITTLE.

1919.			
Dec. 31.	To Law-stamps	$	2 30
	District Registrar		1 00
	"Daily News"		5 80
	A. C. Little		180 90
	Administrafor, commission		10 00

ESTATE OF G. A. JOHNSON.

1919.			
Dec. 31.	To Probate	$	61 00
	"Daily News"		6 00
	Patmore & Fulton		44 95
	Administrator, commission		36 00

ESTATE OF CHARLES ROACH.

1919.			
Dec. 31.	To Prince Rupert Hospital	$	22 18
	City of Prince Rupert, funeral		60 00
	Administrator, commission		4 32

ESTATE OF N. CONDO.

1919.			
Dec. 31.	To District Registrar	$	1 00
	Patmore & Fulton		39 95
	"Daily News"		6 00
	G. Condo		300 00
	Administrator, commission		78 03

ESTATE OF A. F. KILBOURN.

1919.			
Dec. 31.	To District Registrar	$	1 00
	Williams & Manson		42 25
	"Daily News"		5 40
	Administrator, commission		33 25

ESTATE OF CHARLES SINNOTT.

1919.			
Dec. 31.	To Local 38-41, I.L.A.	$	182 39
	H. E. Myers		59 48
	Thompson Hardware		5 66
	Prince Rupert Hospital		39 70
	Dr. McNeill		50 38
	Imperial Machine Works		43 40
	G. B. White		46 49
	Administrator, commission		22 50

ESTATE OF HERMAN ANDERSON.

1919.			
Dec. 31.	To Administrator, commission	$	21 18

ESTATE OF ROBERT J. DUNN.

1919.			
Dec. 31.	To Probate	$	26 40
	"Daily News"		6 00
	Patmore & Fulton		44 95
	Administrator, commission		133 69
	John Dunn		1,000 00

ESTATE OF E. M. HANSON.

1919.			
Dec. 31.	To Administrator, commission	$	3 55

CR.

ESTATE OF CARL HANSON.

1919.			
Dec. 31.	By Cash	$	41 80

ESTATE OF GEORGE LELADAKIS.

1919.			
Dec. 31.	By Cash	$	29 35
	Union Bank		143 40
	Bank of Montreal		114 45

ESTATE OF LOUIS DIXON.

1919.			
Dec. 31.	By P. Hamlin	$	50 00

ESTATE OF WM. CROSBIE.

1919.			
Dec. 31.	By Government Agent, Anyox	$	156 82
	Cash		32 35
	Bank of Commerce		240 50

ESTATE OF MARGARET A. LITTLE.

1919.			
Dec. 31.	By Bank of Montreal	$	200 00

ESTATE OF G. A. JOHNSON.

1919.			
Dec. 31.	By Cash	$	720 00

ESTATE OF CHARLES ROACH.

1919.			
Dec. 31.	By Cash	$	86 50

ESTATE OF N. CONDO.

1919.			
Dec. 31.	By Bank of Commerce	$	1,560 68

ESTATE OF A. F. KILBOURN.

1919.			
Dec. 31.	By Sale of Lot 22, Bk. 16, Sec. 7, Prince Rupert	$	370 00
	Sale of Lot 16, Bk. 22, Sec. 8, Prince Rupert		95 00

ESTATE OF CHARLES SINNOTT.

1919.			
Dec. 31.	By Sale of boat	$	450 00

ESTATE OF HERMAN ANDERSON.

1919.			
Dec. 31.	By Cash	$	423 60

ESTATE OF ROBERT J. DUNN.

1919.			
Dec. 31.	By Bank of Commerce	$	2,673 89

ESTATE OF E. M. HANSON.

1919.			
Dec. 31.	By J. Dybhavn	$	71 00

DR.

ESTATE OF ALFRED KYTE.

1919.			
Dec. 31.	To B.C. Undertakers	$	250 00
	Administrator, commission		41 30

ESTATE OF ELI KNUTSON.

1919.			
Dec. 31.	To Exchange on cheques	$	60

ESTATE OF AARON NELSON.

1919.			
Dec. 31.	To Fisher & Warton	$	28 00
	B.C. Undertakers		99 10
	"Daily News"		8 40
	Administrator, commission		75 66

ESTATE OF GUSTAV GEORGE.

1919.			
Dec. 31.	To Probate	$	30 25
	Patmore & Fulton		39 95
	Prince Rupert Boat-house		2 00
	W. J. McCutcheon		3 95
	"Daily News"		6 00
	P. LaFrance, funeral		100 00
	District Registrar		1 00
	Edgar Harris		10 00
	P. LaFrance, nursing		50 00
	Assessor, taxes, Stewart		22 76
	Assessor, taxes, Melville		6 76
	H. K. Freeman		105 59
	D. Woodmore		6 00
	M. A. Duff		137 05
	A. Archie		27 00
	Christie Grant		10 70
	McLennan, McFeeley		172 43
	F. R. Stewart Co.		48 15
	Swift Canadian Co.		330 03
	Stewart & Mobley		773 25
	Brackman-Ker		209 50
	G. V. Lawrence		140 56
	P. Burns & Co.		388 65
	Imperial Oil Co.		29 34
	Stewart Land Co.		405 00
	William Fraser		5 00
	J. Nesbitt		535 00
	A. E. Young		34 25
	W. C. Cameron		39 65
	P. S. Jack		100 00
	Patmore & Fulton		5 00
	Administrator, commission		362 73
	Madam Clement		3,000 00

CR.

ESTATE OF ALFRED KYTE.

1919.			
Dec. 31.	By Aetna Life Insurance Co.	$	826 00

ESTATE OF ELI KNUTSON.

1919.			
Dec. 31.	By Cash	$	1 45
	T. R. Davis, wages		8 00
	Sale of tools		10 00
	K. Olson, payments on Lot 1429		228 00
	Wages		10 00

ESTATE OF HENRY ROBERTS.

1919.			
Dec. 31.	By Cash	$	213 00

ESTATE OF PETER BROWN.

1919.			
Dec. 31.	By C. Snow, payment on Glacier Mg. share	$	100 00

ESTATE OF AARON NELSON.

1919.			
Dec. 31.	By J. Farnsworth	$	21 00
	Bank of Montreal		1,164 84
	Bank of Commerce		10 03
	War Savings		317 50

ESTATE OF NEIL MCEACHERN.

1919.			
Dec. 31.	By Aeroplane Spruce Lumber Co.	$	29 10

ESTATE OF H. MCP. MARTIN.

1919.			
Dec. 31.	By J. Dorgan, rent of shack	$	36 75

ESTATE OF GUSTAV GEORGE.

1919.			
Dec. 31.	By Store account due deceased	$2,717	19
	Mrs. Duff, payment on Hyder lots		240 00
	E. Herman, rent, Lot 4, Bk. 13, Stewart		60 00
	E. Herman, sale of Lot 4, Bk. 13, Stewart		700 00
	Sun Life policy	1,229	60

J. H. MCMULLIN.
Official Administrator.

COUNTY OF VANCOUVER.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF JOHN ALLEN.

1919.			
May 16.	To Taxes on Australian land ..	$	7 62
	Resealing letters in Australia		31 60
	Copy of Court order		1 00

ESTATE OF ELIZABETH A. APPLETON.

1919.			
April 2.	To Affidavit of value and relationship	$	1 20

ESTATE OF URTRO AALTO.

1919.			
Jan. 2.	To St. George's Hospital	$	10 00
April 2.	Affidavit of value and relationship		1 20
May 22.	Notary fee		50
	Probate duty		1 89
Sept. 21.	Charles Alta		130 50

ESTATE OF C. ASTON.

1919.			
Jan. 2.	To Commission	$	90
	Postage and forms		35

ESTATE OF GILBERT M. ADAMS.

1919.			
April 2.	To Commission	$	5 55
April 26.	Postage and forms		35
	Mount Pleasant Undertakers		100 00
May 5.	"Daily Sun"		11 60
	C. L. Filmore		23 45
May 7.	Commission		5 30
	Copy of Court order		1 00

ESTATE OF ISRAEL ATWELL.

1919.			
May 6.	To Mount Pleasant Undertakers	$	185 01
	Dr. F. C. Dunlop		2 50
	Mrs. Stewart		10 00
	C. L. Filmore		24 90
	Commission		26 23
	Two copies of Court order .		2 00
	Postage and forms		75
Oct. 7.	R. B. Ellis		3 75
Dec. 10.	„		14 32

ESTATE OF EDWIN ANDERSON.

1919.			
Oct. 4.	To Centre & Hanna, Ltd.	$	126 00
	Commission		22 50
	Copy of Court order		1 10
	Postage and forms		50
Oct. 20.	"Daily Province"		10 80
Dec. 3.	Mary Rogerson		12 00
	Dr. A. S. Munro		10 00
Dec. 9.	M. Kallanan		8 00

ESTATE OF PETER BRESSER.

1919.			
Jan. 2.	To B.C. Electric Rly. Co.	$	15 13
	Mary Bresser		125 00
	Commission		27 23
	Copy of Court order, postage, etc.		1 50
Jan. 22.	Harris, Bull & Mason		59 35
Feb. 13.	"Daily World"		8 77
May 16.	Brackman-Ker Milling Co. .		7 90
June 6.	Mary Bresser		50 00
Aug. 5.	„		100 00

ESTATE OF P. BULLY.

1919.			
Jan. 2.	To Commission	$	2 83
	Postage and forms		35
	George Fully		53 47

CR.

ESTATE OF VICTOR ANDERSON.

1919.			
Jan. 14.	By Personal effects	$	1 50

ESTATE OF GILBERT M. ADAMS.

1919.			
Mar. 25.	By Cash	$	111 07
April 15.	Merchants Bank		55 85
April 24.	Victory bond		50 43

ESTATE OF ISRAEL ATWELL.

1919.			
April 16.	By Canadian Bank of Commerce	$	524 59
	I.O.O.F. benefit		75 00

ESTATE OF EDWIN ANDERSON.

1919.			
Oct. 1.	By Royal Bank of Canada	$	450 00

DR.

ESTATE OF CATHERINE ANN BAKER.

1919.			
April 2.	To G. Roy Long	$	54 20
	T. J. Kearney & Co.		138 50
	"Daily World"		8 45
	D. E. Gendron		135 50
	Commission		24 56
	Copy of Court order, postage, etc.		1 50
April 26.	General Hospital		13 50
May 1.	Mrs. J. Hancox		29 80
	Dr. L. Telford		10 00
	Probate duty		1 63
Sept. 20.	E. A. Baker		72 36
Nov. 3.	Affidavit of value and relationship		1 20

ESTATE OF FRED H. BATTS.

1919.			
April 2.	To "Daily Sun"	$	2 50
	Brook & Sandstrum		12 00
	Ella M. Jones		760 00
	McTaggart & Ellis		32 25
	Commission		122 53
	Copy of Court order, postage, etc.		1 50
April 26.	M. P. Mahoney		179 00
July 15.	Ella M. Jones		450 00
Aug. 4.	Wilson & Whealler		67 50
Sept. 25.	Probate duty		9 96
Oct. 24.	Mrs. Maym Batts		181 76

ESTATE OF STANLEY BARTLETT.

1919.			
June 2.	To McTaggart & Ellis	$	21 05
	Commission		5 14
	Copy of Court order, postage, etc.		1 35
	"Daily Sun"		10 40
	J. H. McMullin		64 95

ESTATE OF RICHARD BATTEN.

1919.			
June 2.	To MacInnes & Arnold	$	32 85
	T. J. Kearney & Co.		103 00
	Commission		16 19
	Copy of Court order, postage, etc.		2 25
June 19.	Henry Pybus		5 00
June 27.	"Daily Sun"		18 90
	Yorkshire & Canadian Trust, Ltd.		163 54

ESTATE OF CHARLES N. BAKER.

1919.			
July 22.	To Estate of Charles Baker	$	748 84

ESTATE OF JOHN BUICK.

1919.			
June 17.	To Taxes, Lot 1, Bk. 2, D.L. 70	$	12 00

ESTATE OF JAMES BROWN.

1919.			
Mar. 3.	To T. Matthews	$	5 00
June 20.	Spraying orchard		8 50
July 21.	Water rates		6 70
Aug. 4.	Taxes		718 15
Nov. 3.	„		235 74
	„		19 32

ESTATE OF ANTON BERGERSON.

1919.			
Mar. 27.	To C. B. Stahlschmidt (Consul)	$	1,209 55

ESTATE OF J. B. BURDETTE.

1919.			
Jan. 10.	To B. M. Burditt	$	43 51

ESTATE OF ADOLPH BERGLUND.

1919.			
Feb. 3.	To "Daily Sun"	$	25 20
Mar. 3.	General Hospital		1 50
July 15.	Taxes, Lot 5, Bk. 5, Tp. 33, Sec. 7		18 20
Aug. 4.	Taxes, N.E. Sec. 9, Tp. 33		78 87

ESTATE OF JESSE BRIGHT.

1919.			
Feb. 3.	To "Daily Province"	$	14 70
	Farris & Emerson		31 05
	Commission		35 77
Feb. 4.	Copy of Court order		1 00
Dec. 3.	Affidavit of value and relationship		1 20
Dec. 24.	Probate duty		41 28

CR.

ESTATE OF CATHERINE ANN BAKER.

1919.			
Mar. 4.	By Royal Bank of Canada	$	491 20

ESTATE OF FRED H. BATTS.

1919.			
Mar. 26.	By Bank of Montreal	$	2,450 75

ESTATE OF STANLEY BARTLETT.

1919.			
May 13.	By Bank of Commerce	$	102 89

ESTATE OF RICHARD BATTEN.

1919.			
May 9.	By Rent	$	18 00
May 27.	Bank of Montreal		305 73
June 9.	Rent		18 00

1919. ESTATE OF EDWARD BACKMAN.

Oct. 30.	By Effects	$	8 00
	Bank of Commerce		1 46

1919. ESTATE OF ADOLPH BERGLUND.

Feb. 10.	By Refund, "Daily Sun"	$	13 20

1919. ESTATE OF JESSE BRIGHT.

Jan. 23.	By Bank of Nova Scotia	$	715 48

DR.

ESTATE OF CYRIL BOSNIT.

1919.			
Jan. 22.	To J. A. Campbell & Co.	$	35 50
Feb. 3.	"Daily Sun"		15 00
	Commission		7 64
	Copy of Court order		1 00
	Affidavit of value and relationship		1 20
	Probate duty		2 17

ESTATE OF GARDASIO BARDATI.

1919.			
Jan. 2.	To Commission	$	1 00
Feb. 3.	"Daily Sun"		25 20
Sept. 2.	Simeoni Fabi		131 00
Dec. 3.	Affidavit of value		1 20
Dec. 24.	Probate duty		24 90

ESTATE OF ELIZABETH BRADBURY.

1919.			
Sept. 5.	To Taxes, Lot 6, Bk. 10, D.L. 183	$	34 72
Nov. 3.	Copy of letters of administration		1 00
	Thomas Caravan		50 00

ESTATE OF CHARLES BAKER.

1919.			
Aug. 4.	To "The World"	$	10 35
	Ellen Baker		500 00
	Ellis & Brown		37 95
Aug. 5.	Commission		37 44
	Sundries		1 50
Oct. 4.	Commission		20 42
Oct. 20.	Affidavit of value		1 20
	Probate duty		7 48
	Ellen Baker		540 90

ESTATE OF GEORGE BAKER.

1919.			
Aug. 4.	To A. C. Brydone-Jack	$	24 50
	Armstrong Hotson		135 50
Aug. 5.	Commission		22 26
Sept. 2.	"Daily Sun"		18 90
	General Hospital		9 00
	Sundries		1 35

ESTATE OF JOHN BATARI.

1919.			
Sept. 2.	To Commission	$	17 38
Sept. 4.	MacInnes & Arnold		26 05
Oct. 4.	"Daily Sun"		8 40
Oct. 20.	Armstrong & Hotson		78 50
	Sundries		1 90
	Storage and cartage		2 00

ESTATE OF DAVID BENNETT.

1919.			
Nov. 10.	To Commission	$	10 10
Nov. 21.	"Daily Sun"		19 60
	Sundries		50

ESTATE OF EMMA CUNNINGHAM.

1919.			
Nov. 21.	To Taxes, Lots 11, 12, Bk. 4, Penticton	$	12 40

ESTATE OF FRANCIS D. COOPER.

1919.			
Oct. 8.	To Taxes, Lot 4, Bk. 6A, D.L. 326A	$	25 00
Nov. 3.	Taxes and tax-sale charges		21 42
	Commission		7 60
Dec. 31.	T. A. Cooper		96 15

ESTATE OF WILLIAM CRAWFORD.

1919.			
May 28.	To Commission	$	42 33
Feb. 3.	Water rates		9 60
June 2.	W. D. McFarlen & Co.		90 00
	Adjustment of taxes		10 30
	Adjustment of rent		6 25
June 6.	Taxes, Lot 33, Bk. 96, D.L. 550		23 10
	Taxes, Lots 1, 2, 6, Bk. 87, D.L. 549		85 13
July 3.	Registration charges		7 85
July 15.	Taxes, Bk. 15, 16, Lot 1621		20 43
Aug. 4.	Water rates		4 80
Aug. 5.	Taxes, Lots 15, 16, D.L. 1621		2 27
	Sundries		2 50

CR.

ESTATE OF CYRIL BOSNIT.

1919.			
Jan. 15.	By Royal Bank of Canada	$	152 88

ESTATE OF ELIZABETH BRADBURY.

1919.			
June 6.	By Rent	$	11 00
	Payments on house		54 00
	Refund on taxes		34 55
Mar. 29.	Payment on 1636 Union St.		10 00

ESTATE OF CHARLES BAKER.

1919.			
July 30.	By Father's estate	$	748 84
Sept. 15.	Department of Militia		408 40

ESTATE OF GEORGE BAKER.

1919.			
July 31.	By Molsons Bank	$	445 25

ESTATE OF JOHN BATARI.

1919.			
July 24.	By Cash	$	53
	Effects		15 00
Aug. 15.	Wages		23 77
Aug. 29.	Royal Bank		308 30

ESTATE OF DAVID BENNETT.

1919.			
Oct. 21.	By Department of Militia	$	202 22

ESTATE OF FRANCIS D. COOPER.

1919.			
Sept. 25.	By Lot 4, Bk. 6A, D.L. 326A	$	150 00

ESTATE OF WILLIAM CRAWFORD.

1919.			
May 28.	By Payment on Lot 3, Bk. 87, D.L. 549	$	600 00
	Rents		210 25

DR.

ESTATE OF PATRICK CORBETT.

1919.			
Feb. 3.	To Water rates	$	3 15
July 17.	"		3 15
Sept. 5.	Taxes, Lot 13, Bk. 15, D.L. 196		83 40

ESTATE OF ISABELLA CARGILL.

1919.			
June 6.	To Taxes, Lot 19, Bk. 2, D.L. 339	$	9 92

ESTATE OF THOMAS D. CUMMINGS.

1919.			
Mar. 17.	To Taxes, Lots 23, 24, 25, Bk. 11	$	37 00
Oct. 27.	A. F. Cummings		8 00

ESTATE OF JOHN J. CHRISTIE.

1919.			
Mar. 3.	To Commission	$	15 00
Mar. 7.	McTaggart & Ellis		23 70
	Sundries		1 50

ESTATE OF WILLIAM H. CRUMMER.

1919.			
Feb. 13.	To Water rates	$	4 20
Mar. 17.	Interest on mortgage		72 00
April 2.	Commission		6 75
July 11.	Interest on mortgage		24 00
July 17.	Water rates		4 20
Aug. 18.	Insurance on house		6 40
Nov. 3.	Annie K. Crummer		20 00
	Taxes, Lot 8, Bk. 46, D.L. 200A		128 20
	Interest on mortgage		24 00

ESTATE OF IGNATI CHIRICA.

1919.			
April 2.	To Affidavit of value	$	1 20
May 22.	Probate duty		25 70

ESTATE OF HENDRIK CARTOEF.

1919.			
April 2.	To Farris & Emerson	$	34 70
	Commission		6 11
April 9.	T. Edwards Co.		115 50
	Probate duty		4 75
	Sundries		3 40

ESTATE OF EDWARD E. CROZIER.

1919.			
Sept. 4.	To Olive Crozier	$	9 57
Nov. 3.	King & Ginn		22 26
	Commission		3 85
	Sundries		2 20
Nov. 21.	Olive Crozier		39 06

ESTATE OF MATTHEW CURRY.

1919.			
Jan. 2.	To Commission	$	110 92
Jan. 10.	Rogers & Leith		6 00
	Patterson, Chandler & Stephen		21 25
	T. J. Kearney & Co.		204 00
Feb. 3.	"Daily Sun"		54 60
Mar. 1.	Water rates		5 10
Mar. 5.	R. B. Ellis		7 60
Mar. 27.	McPhillips & Smith		37 00
May 1.	C. J. Cummings & Co.		87 00
June 6.	Rogers & Leith		6 25
July 21.	Water rates		5 10
Aug. 9.	McPhillips & Smith		17 15
Sept. 25.	Taxes, Lots 36, 37, Bk. 40, D.L. 540		185 43
Oct. 27.	Sterling & Co.		138 75
Nov. 3.	Dr. Bowes		6 50
	Wm. Ralph, Ltd.		18 20
Dec. 31.	Probate duty		57 89
	Succession duty		563 59
	Commission		14 10
	Sundries		2 95

ESTATE OF ALEXANDER CUNNINGHAM.

1919.			
Feb. 21.	To A. C. Brydone-Jack	$	32 50
Mar. 3.	"Daily Sun"		10 00
	Commission		21 03
Mar. 12.	A. C. Brydone-Jack		18 30
	Sundries		2 55

ESTATE OF JAMES CONWAY.

1919.			
Jan.	To Commission	$	6 61

CR.

ESTATE OF THOMAS D. CUMMINGS.

1919.			
Nov. 20.	By Rents	$	20 00

ESTATE OF JOHN J. CHRISTIE.

1919.			
Feb. 24.	By N.W. ¼ Sec. 15, Tp. 8	$	300 00

ESTATE OF WILLIAM H. CRUMMER.

1919.			
Dec. 24.	By Rents	$	306 00

ESTATE OF HENDRIK CARTOEF.

1919.			
Mar. 20.	By Bank of Commerce	$	112 25

ESTATE OF EDWARD E. CROZIER.

1919.			
Oct. 29.	By Royal Bank	$	67 37

ESTATE OF MATTHEW CURRY.

1919.			
Dec. 3.	By Rents	$	331 50
	Cash		42

ESTATE OF ALEXANDER CUNNINGHAM.

1919.			
Feb. 17.	By Royal Bank	$	376 70
July 31.	Rifle		8 00

ESTATE OF JAMES CONWAY.

1919.			
May 26.	By Wages	$	65 35

DR.

ESTATE OF FRED. CHARNEY.

1919.			
Mar. 27.	To R. W. Floyd	$	15 00
	Sundries		2 20

ESTATE OF JOHN CRAIB.

1919.			
Jan. 2.	To Harron Bros.	$	126 00
	Commission		38 35
Feb. 13.	"The World"		12 35
	Wm. Savage		52 90
Oct. 4.	Probate duty		6 26
	Sundries		2 70

ESTATE OF JAMES CRANSTON.

1919.			
Feb. 20.	To T. J. Kearney & Co.	$	35 00
	Commission		1 97
	Sundries		2 85

ESTATE OF JOHN CARABINES.

1919.			
Feb. 4.	To Commission	$	2 14
	T. Carabines		40 26
	Sundries		35

ESTATE OF GIOVANNI CARNICIA.

1919.			
Mar.	To T. J. Kearney & Co.	$	149 00
Mar. 7.	McTaggart & Ellis		38 65
Mar. 12.	St. Joseph Rushlowe		80 00
April 2.	"Daily Sun"		36 40
April 9.	Shand Electric Co.		29 99
	Insurance		24 00
Sept. 2.	Bishop, Gaskell & Co.		215 50
Sept. 12.	Taxes, Lots 1, 2, 3, Bk., D.L. 192		294 75
	Taxes, Lot 2, Bk. 12, D.L. 540		30 20
	Water rates		8 25
	Commission		116 01
	Sundries		5 00

ESTATE OF SYDNEY COPE.

1919.			
Aug. 5.	To Commission	$	4 25
	Telegrams, Ocean Falls		5 01
	Sundries		2 70

ESTATE OF JAMES M. CARLYLE.

1919.			
Sept. 19.	To Launch-hire	$	16 50
Oct. 4.	Longson, Campbell & Meredith		33 85
	"Daily Province"		10 35
	Dr. E. Bolton		12 50
	Harron Bros.		150 00
	Commission		14 33
	Sundries		2 00

ESTATE OF CHU SEN.

1919.			
Nov. 3.	To St. Paul's Hospital	$	68 50
	Dr. Gillas		75 00
	T. J. Kearney & Co.		72 00
	Dr. C. W. Proud		25 00
	Commission		37 07
	Sundries		1 50

ESTATE OF THOMAS R. DOBSON.

1919.			
June 2.	To Commission	$	25 00
	Isabella A. Dobson		2,433 44
	Davis & Co.		102 85

ESTATE OF GIOVANNI DIPONIA.

1919.			
April 2.	To Commission	$	5 00
	Copy of Court order		1 00

ESTATE OF JOHN S. DUGUID.

1919.			
Feb. 13.	To Water rates	$	3 15
June 2.	Dr. F. P. Patterson		85 00
	Commission		12 94
	Sundries		50
July 17.	Water rates		3 15
Nov. 28.	Taxes, Lot 42, Bk. 162, D.L. 264A		85 80
	Taxes, Lot 42, Bk. 162, D.L. 264A		46 48

CR.

ESTATE OF FRED. CHARNEY.

1919.			
Mar. 31.	By Wages	$	29 03
May 19.	Effects		6 00

ESTATE OF JOHN CRAIB.

1919.			
Feb. 20.	By Workmen's Compensation	$	15 40

ESTATE OF JAMES CRANSTON.

1919.			
Feb. 20.	By Effects	$	2 50

ESTATE OF JOHN CARABINES.

1919.			
Jan. 22.	By Wages	$	42 75

ESTATE OF GIOVANNI CARNICIA.

1919.			
Feb. 11.	By Effects	$	1 00
	Cash		14 70
Feb. 27.	Banks		1,620 21
Mar. 31.	Bond		508 50
	Watch		2 00
	Rents		220 00
Dec. 3.	Refund of taxes		8 75

ESTATE OF SYDNEY COPE.

1919.			
July 30.	By Cash	$	76 00
	Effects		9 00

ESTATE OF JAMES M. CARLYLE.

1919.			
Aug. 22.	By Cash	$	13 66
	Effects		10 50
Sept. 24.	Bank of Hamilton		252 46

ESTATE OF CHU SEN.

1919.			
Oct. 2.	By Cash	$	12 50
	Victory bond		216 67
Oct. 17.	Bank of Montreal		512 40

ESTATE OF THOMAS R. DOBSON.

1919.			
May 22.	By Lot 6, Bk. 11, D.L. 634	$	2,560 28

ESTATE OF GIOVANNI DIPONIA.

1919.			
Mar. 12.	By Lot 29, Bk. 4, D.L. 708	$	100 00

ESTATE OF JOHN S. DUGUID.

1919.			
Jan. 3.	By Cash	$	5 00
Jan. 23.	Lot 43, Bk. 162, D.L. 264A		50 00
April 1.	Rent		10 00
May 14.	Lot 43, Bk. 162, D.L. 264A		168 85

DR.

ESTATE OF JOSEPH DE SILVA.

1919.			
July 16.	To Taxes, Lots 11, 12, Bk. 11, D.L. 151, 153	$	10 32

ESTATE OF JAMES DWYER.

1919.			
June 6.	To Taxes, Lot 30, Bk. 29, D.L. 200	$	7 50
July 15.	Taxes, Lots 35, 36, Bk. 15, D.L. 122		15 60

ESTATE OF JOHN DOSKOCH.

1919.			
Jan. 2.	To T. J. Kearney & Co.	$	74 00
	Commission		9 02
	Sundries		1 85

ESTATE OF HARRY DOWNING.

1919.			
Feb. 3.	To Dr. D. A. Tomset	$	40 00
	Commission		6 64
	Nunn, Thomson & Clegg		85 86
	Sundries		35

ESTATE OF GUNNAR DAHL.

1919.			
May 7.	To Commission	$	1 65
	Sundries		35
	C. B. Stahlschmidt		35 00

ESTATE OF JAMES DUNLOP.

1919.			
May 5.	To North Vancouver Hospital	$	8 00
	McTaggart & Ellis		22 50
	Harron Bros.		96 00
	Commission		7 02
	Sundries		2 60

ESTATE OF GEORGE H. DARLING.

1919.			
Aug. 5.	To Commission	$	14 82
Sept. 12.	"The World"		9 60
Dec. 3.	Larn, Wood & Co.		27 90
	Sundries		2 35

ESTATE OF VALENTINO DAPOTO.

1919.			
July 2.	To Francis Frederica	$	125 00
	T. J. Kearney & Co.		118 00
	Commission		209 03
	B. Santuci		39 00
July 11.	McTaggart & Ellis		29 65
	"Daily Province"		44 20
	Receiver-General		24 51
Oct. 24.	Taxes, Lot 16, Bk. 9, D.L. 622		3 08
Nov. 21.	Taxes, Lot 30, Bk. 23, D.L. 182		55 94
Dec. 3.	Taxes, Lot 16, Bk. 9, D.L. 622		2 56
	Commission		70 06
	Sundries		7 25

ESTATE OF HARRY EAMEN.

1919.			
Jan. 22.	To W. H. Grassu	$	115 00
	N. D. Darling		356 20
	Josephine Johnson		150 00
	T. E. Highland		88 47
	Affidavit of value		1 20

ESTATE OF WELLINGTON S. EVANS.

1919.			
Feb. 3.	To "Daily Sun"	$	25 20
Aug. 5.	Commission		7 50
	Affidavit of value		1 20
Aug. 12.	Probate duty		7 76
Nov. 24.	M. G. Evans		325 91
	E. E. Read		325 90

CR.

ESTATE OF CHARLES S. DAVIS.

1919.			
May 22.	By Effects	$	5 00

ESTATE OF HARRY DOWNING.

1919.			
Jan. 10.	By Cash	$	47 85
	Hotel Regent		85 00

ESTATE OF GUNNAR DAHL.

1919.			
Feb. 24.	By Cash	$	33 00
Mar. 25.	Effects		4 00

ESTATE OF JAMES DUNLOP.

1919.			
April 3.	By Cheque	$	10 00
	Bank of Commerce		29 14
May 2.	Victory bond		101 30

ESTATE OF GEORGE H. DARLING.

1919.			
July 10.	By Cash	$	148 90
	Bank of Montreal		147 60

ESTATE OF VALENTINO DAPOTO.

1919.			
June 18.	By Cash	$	23 35
	Wages		295 12
	Effects		2 50
June 27.	Imperial Bank		303 30
	Bank of Montreal		3,556 15
July 15.	B.C. Permanent Loan Co. shares		324 00
	P.O. savings		1,030 86
Nov. 2.	600 lire		46 38

ESTATE OF GEORGE DYKER.

1919.			
Dec. 27.	By Royal Bank	$	473 34

ESTATE OF JOHN ERIKSON.

1919.			
Mar. 5.	By Cash	$	25

DR.

ESTATE OF THEOPHILUS EDMUNDS.

1919.			
Sept. 2.	To Harron Bros.	$ 162	00
	Commission	166	17
Nov. 22.	"Daily Province"	27	20
	Scrimgeour & Hogg	58	13
Nov. 24.	Probate duty	31	61
	Sundries	3	95

ESTATE OF REGINALD T. EAGER.

1919.			
Feb. 3.	To Interest on mortgage	$ 50	00
	Water rates	10	20
Mar. 3.	Sterling & Co.	31	25
May 5.	Interest on mortgage	50	00
July 17.	Water rates	10	20
Aug. 12.	Taxes	172	15
		70	92
Oct. 4.	Interest on mortgage	50	00
Oct. 20.	Bishop, Gaskell & Co.	34	50
Dec. 24.	Taxes	72	00
	Commission	41	75

ESTATE OF THOMAS FLYNN.

1919.			
Mar. 3.	To Taxes, Lot 5, Bk. 8, Lot 1242	$ 2	30
Mar. 7.	Taxes, N.W. ¼ Sec. 25, Tp. 6	6	03
	Taxes, Lot 5, Bk. 8, Ymir	1	80

ESTATE OF EDWARD H. FRASER.

1919.			
Jan. 2.	To Harron Bros.	$ 69	00
Feb. 3.	"Daily Province"	10	40
	Ellis & Brown	32	10
June 27.	Probate duty	2	64
	Commission	16	65
	Sundries	3	55
	S. W. Fraser	198	85

ESTATE OF FREDERICK FREEMAN.

1919.			
May 6.	To C. L. Filmore	$ 36	70
Dec. 12.	Taxes, Lot 23, Bk. 14, D.L. 2023	17	96
Dec. 18.	Dr. J. A. Macdonald	10	00
	Commission	5	03
	"The World"	11	70
	Sundries	1	50

ESTATE OF JOHN FREDERICKSON.

1919.			
Oct. 4.	To Commission	$ 4	77
	E. A. Halliday	2	50
	Joseph Alliver	16	15
	Commission and sundries	5	27

ESTATE OF WILLIAM A. FOSTER.

1919.			
June 2.	To Probate duty	$ 88	39
	Succession duty	440	07
	Commission	392	74
Aug. 18.	Receiver-General, tax	29	60
	Taxes, Lot 10, Bk. 119	4	72
Sept. 16.	Abbot, Macrae & Co.	89	35
	Agnes M. Fowler	3,404	11
	Sundries	1	75
	Roland A. Forster	3,404	12

ESTATE OF JOB GREASLEY.

1919.			
June 17.	To Miner's licence	$ 5	00
Dec. 9.	J. A. Tomlinson	731	00
	Rosina K. Smith	58	00
	J. W. Ford	5	00
	Burrard Hotel	129	85
	B. H. Champion	122	50
	Davis & Co.	258	06
	A. R. Hanscome	83	35
	Mrs. Telford	149	65
	John Kerr	800	00
	Commission	490	00
	Registering conveyance	13	50
	Mrs. E. Harris	200	00
	"Daily Sun"	5	60
	Sundries	4	20

CR.

ESTATE OF THEOPHILUS EDMUNDS.

1919.			
July 7.	By Cash	$ 46	60
	Effects	7	00
Aug. 19.	Bank of Montreal	3,269	90

ESTATE OF REGINALD T. EAGER.

1919.			
Nov. 20.	By West ½ Lot 2, Bk. 24, D.L. 540	$ 671	85
Dec. 29.	Rents	729	00

ESTATE OF EDWARD H. FRASER.

1919.			
Jan. 27.	By Royal Bank	$ 188	94
Feb. 7.	Bank of Montreal	26	75

ESTATE OF FREDERICK FREEMAN.

1919.			
Feb. 28.	By Effects	$ 48	00
	Cash	8	25
April 30.	Merchants Bank	44	35
Sept. 15.	Rent	4	50
Dec. 24.	Watch	8	00

ESTATE OF JOHN FREDERICKSON.

1919.			
Sept. 16.	By Cash and effects	$ 6	50
	Wages	88	79

ESTATE OF WILLIAM A. FOSTER.

1919.			
May 22.	By Bank of Montreal	$7,854	85
Nov. 12.	Refund of duty	65	15

ESTATE OF WALTER J. FRAME.

1919.			
Dec. 19.	By North British & Mercantile Insurance Co.	$ 944	70

ESTATE OF JOB GREASLEY.

1919.			
Dec. 9.	By Mining property	$9,800	00

DR.

ESTATE OF GOLS (OTHERWISE GONS).

1919.			
Jan. 22.	To J. W. Ford	$	20 00
Feb. 3.	Rosebank Grocery		12 50

ESTATE OF JAMES A. GODDARD.

1919.			
April 2.	To Mount Pleasant Undertakers	$	100 00
	G. R. Long		21 85
Nov. 21.	Commission		10 54
	A. Goddard		53 54
	Sundries		1 85

ESTATE OF B. GIOVANNI.

1919.			
Jan. 2.	To Commission	$	3 04
June 17.	T. Edwards Co.		57 40
	Sundries		35

ESTATE OF H. GUTNOFF.

1919.			
Jan. 2.	To Commission	$	1 48
Mar. 27.	T. Edwards Co.		29 80
	Sundries		35

ESTATE OF JAMES C. GASCOINE.

1919.			
Jan. 2.	To Perry & Mack	$	60 00
	Commission		3 22
	Sundries		35

ESTATE OF HYALMER GUSTAVSON.

1919.			
Feb. 3.	To Thure Gustavson	$	130 00
	Commission		55 24
Feb. 13.	Centre & Hanna		135 50
	"Daily Sun"		23 40
	J. A. Campbell & Co.		37 70
Feb. 21.	S. Blumberger		175 00
	Probate duty		6 64
	Sundries		3 70

ESTATE OF JOHN GRANLAND.

1919.			
April 3.	To Commission	$	2 40
May 12.	A. Granland		45 30
	Sundries		35

ESTATE OF PETER GRANT.

1919.			
Feb. 3.	To Dr. Murphy	$	5 00
	Harron Bros.		120 00
	Frank Curle		21 00
June 17.	W. P. Johns		24 00
July 2.	Harron Bros.		14 00
	Killam & Beck		30 15
	Commission		24 46
	Sundries		2 50
Aug. 4.	"Daily Sun"		18 20
Aug. 8.	Mary Curle		125 00

1919. ESTATE OF JOHN M. GRAHAM.

Mar. 3.	To Taxes, Lot 31, Bk. 15, D.L. 391 and 392	$	128 70
	Water rates		7 00
	Griffith & Lee		318 05
	Probate duty		4 00
April 2.	Commission		30 81
July 2.	A. C. Sutton		36 00
Oct. 24.	"Daily Sun"		17 50
	E. S. Anthony		12 25
	Sundries		1 50

1919. ESTATE OF ELIZABETH A. HATCH.

April 2.	To Mack Bros.	$	126 00
	Commission		15 00
July 22.	Bird, Macdonald & Co.		150 00
Sept. 2.	Dominion Bank		35 10

1919. ESTATE OF CHARLES E. HAMILTON.

May 16.	To Bond for Manitoba	$	28 00
June 2.	G. L. West		535 60
	R. S. Rowland		280 00
	John H. Meanwell		63 13
Sept. 4.	Commission		244 63
	George McIntyre		333 12
	J. R. Hamilton		565 10
	G. A. Richardson		1,270 00
	Sundries		1 49

CR.

ESTATE OF JAMES A. GODDARD.

1919.			
Mar. 12.	By Royal Bank	$	101 88
	Cash and wages		14 00
	Drumm Lummon shares		58 95

ESTATE OF H. GUTNOFF.

1919.			
Oct. 21.	By Effects	$	2 00

ESTATE OF HYALMER GUSTAVSON.

1919.			
Jan. 31.	By Banks	$	1,104 75

ESTATE OF JOHN GRANLAND.

1919.			
Jan. 29.	By Cash	$	85
Mar. 26.	Wages		47 20

ESTATE OF PETER GRANT.

1919.			
Jan. 7.	By Cash	$	165 00
June 25.	Bank of Toronto		324 20
Oct. 2.	" "		4 69

1919. ESTATE OF JOHN M. GRAHAM.

Feb. 8.	By Lot 31, Bk. 15, D.L. 391 and 392	$	616 35

1919. ESTATE OF ANDREW GROVEN.

Dec. 8.	By Effects	$	25 00
	Cash		18 00

1919. ESTATE OF ELIZABETH A. HATCH.

Mar. 7.	By Machinery	$	300 00

DR.

ESTATE OF WILLIAM HENNAN.

1919.			
June 6.	To Taxes, Lot 1, Bk. 28; Lot 33, D.L. 549-50	$	11 20
Sept. 5.	Taxes, Lots 6 and 7, Bk. 2, D.L. 51		8 35
Nov. 21.	Taxes, Lot 30, Bk. 3; Lots 7 and 8, D.L. 394		33 05

ESTATE OF WILLIAM H. HOLLINGSWORTH.

1919.			
Aug. 4.	To Interest on mortgage	$	90 00
Dec. 24.	„ „		90 98

ESTATE OF RICHARD HUGHES.

1919.			
Jan. 10.	To General Hospital	$	35 75
Sept. 2.	„		43 05

ESTATE OF OTTO HARTIKKA.

1919.			
Sept. 2.	To Harron Bros.	$	87 00

ESTATE OF MATTE HIILSTO.

1919.			
Oct. 2.	To Probate duty	$	4 56
Nov. 3.	Affidavit of value		1 20

ESTATE OF EDWARD J. HENDERSON.

1919.			
Jan. 10.	To Nunn, Thomson & Clegg	$	25 80
May 8.	Commission		1 35

ESTATE OF HENRY E. HODGE.

1919.			
Jan. 2.	To Commission	$	4 60
Jan. 10.	R. J. Carson		15 00
Feb. 3.	J. Roys and E. Hodge		72 09
	Sundries		35

ESTATE OF THOMAS HARDEN.

1919.			
June 6.	To Interest on mortgage	$	14 00
July 11.	"Daily Province"		6 60
	Water rates		4 20
Sept. 4.	Interest on mortgage		14 00
Oct. 4.	W. Turtle		6 80
Nov. 3.	Advertising house		70

ESTATE OF ANGEL HEVIA.

1919.			
Feb. 23.	To N. R. Fisher	$	34 70
April 2.	Harron Bros.		80 00
	Commission		6 05
	Sundries		25

ESTATE OF HARRY HARROD.

1919.			
Feb. 4.	To Commission	$	6 58
Feb. 12.	Perry & Mack		90 00
	Sundries		35

ESTATE OF ALAN HURST.

1919.			
April 2.	To "Daily Province"	$	7 35
	Commission		3 24
April 4.	Farris & Emerson		34 30
Nov. 11.	T. Kearney & Co.		100 00
	Commission		5 09
	Sundries		1 50

ESTATE OF OSKARI HEIKKINEN.

1919.			
April 2.	To Mount Pleasant Undertakers	$	79 00
	Dickie & DeBeck		31 90
	Commission		6 05
	Sundries		3 68

ESTATE OF ALBERT C. HASSARD.

1919.			
April 2.	To Harris, Bull & Mason	$	42 17
	"The World"		11 25
	Commission		30 61
	Sundries		1 50
April 8.	Elizabeth M. Hassard		263 38

CR.

ESTATE OF WILLIAM HENNAN.

1919.			
Oct. 30.	By Watch	$	15 00

ESTATE OF THOMAS HARDEN.

1919.			
Nov. 4.	By Rents	$	100 00

ESTATE OF ANGEL HEVIA.

1919.			
Jan. 25.	By Bank of Hamilton	$	121 02

ESTATE OF GEORGE HOUSTON.

1919.			
	By Cash	$	3 88

ESTATE OF HARRY HARROD.

1919.			
Jan. 3.	By Cash	$	131 60

ESTATE OF ALAN HURST.

1919.			
Mar. 3.	By Cash	$	64 78
June 11.	Bank of Commerce		101 80

ESTATE OF OSKARI HEIKKINEN.

1919.			
Mar. 28.	By Bank of Commerce	$	121 03
June 30.	Watch		7 00

ESTATE OF ALBERT C. HASSARD.

1919.			
Mar. 28.	By Bank of Montreal	$	612 29

Dr.

ESTATE OF GEORGE HOLMES.

1919.			
May 6.	To G. R. Long	$	39 46
	Dr. D. M. Mackay		12 50
	Commission		21 35
	Probate duty		4 14
	"Daily Sun"		19 60
	Sundries		2 70
	Charles Holmes		327 15

ESTATE OF ANDREW HALVORSEN.

1919.			
Oct. 20.	To McTaggart & Ellis	$	24 40
	"Daily Province"		10 80
	Commission		35 21
	Sundries		4 00

ESTATE OF MABEL A. S. HUTCHINSON.

1919.			
July 2.	To Tiffin & Alexander	$	102 76
	"Daily Sun"		44 80
	Dr. Colin Graham		250 00
July 11.	James Hutchison		502 58
	Commission		128 07
	Sundries		6 00

ESTATE OF MATTIE HARPER.

1919.			
Nov. 3.	To Mount Pleasant Undertakers	$	285 00
	Dr. A. S. Murphy		90 00
	Canadian Financier's Trust Co.		20 00
	S. E. Williams		8 85
	"Daily Province"		19 55
Nov. 21.	B. N. Kerr		37 75
	Dr. W. D. Murphy		5 00
	Scrimgeour & Hogg		39 45
Dec. 18.	M. J. Harper		1,004 00
	Commission		109 44
	Sundries		2 75

ESTATE OF KATE E. HENWOOD.

1919.			
Nov. 21.	To Telephone account	$	2 05
	M. Williamson		19 00
	Singer Sewing Machine Co.		11 00
Dec. 3.	J. R. Jacobs		18 00
	"Daily Province"		8 95
	Congdon, Campbell & Meredith		28 00
	B.C. Telephone Co.		7 35
	Commission		22 72
	Sundries		2 50

ESTATE OF WILLIAM HOCKING.

1919.			
Dec. 3.	To Commission	$	18 54
	"Daily Sun"		8 40
	D. W. F. McDonald		30 85
	Sundries		2 00

ESTATE OF SAMUEL S. JOHNSTON.

1919.			
Mar. 12.	To Charles Johnston	$	88 59
	Affidavit of value		1 20

ESTATE OF M. JELVIC.

1919.			
Jan. 2.	To Commission	$	7 50
	T. Edwards Co.		190 00
	Serbian Workman's Society.		7 37

ESTATE OF ALLAN M. JOHNSON.

1919.			
Feb. 4.	To Commission	$	27 54

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ESTATE OF GEORGE HOLMES.

1919.			
April 19.	By Union Bank	$	426 90

ESTATE OF ANDREW HALVORSEN.

1919.			
May 23.	By Cash	$	41 60
June 16.	Effects		2 00
Sept. 26.	Wages		31 00
Oct. 17.	Banks		542 69
	Victory bond		101 59

ESTATE OF MABEL A. S. HUTCHINSON.

1919.			
June 6.	By Bank of Commerce	$	241 86
June 16.	Anglo-French bond		199 15
	C.P.R. shares		648 00
	War bond		502 50
July 15.	Life insurance		474 02
Aug.	C.P.R. dividend		10 00

ESTATE OF MATTIE HARPER.

1919.			
Oct. 21.	By Molsons Bank	$2,004	60
	Furniture and effects		184 10

ESTATE OF KATE E. HENWOOD.

1919.			
Oct. 23.	By Cash	$	44 45
Nov. 10.	Pension		25 30
Nov. 17.	Furniture and effects		267 30
Nov. 29.	Bank of Commerce		117 41
Dec. 26.	Life insurance		250 75

ESTATE OF JOHN H. HUTCHINSON.

1919.			
Dec. 23.	By Life insurance	$1,000	00

ESTATE OF WILLIAM HOCKING.

1919.			
Nov. 12.	By Dominion Bank	$	370 85
Dec. 8.	Travellers' cheques		137 15

ESTATE OF JAMES IRVING.

1919.			
Mar. 22.	By Cheque	$	70 00

ESTATE OF ALBERT J. H. JENNER.

1919.			
Oct. 30.	By Watch	$	6 00

ESTATE OF ALLAN M. JOHNSON.

1919.			
July 13.	By Cash	$	27 54

DR.

ESTATE OF THOMAS G. KITSON.

1919.			
July 2.	To Taxes, Lots 2, 3-1-7, 39, 32-1-18-391 and 392	$	126 47
	David Lyon		13 00
	Commission		10 05
Sept. 25.	Taxes, Lots 17 and 18, Bk. 93, D.L. 540		26 60
	Sundries		1 20

ESTATE OF PAUL KARLENSA.

1919.			
Jan. 2.	To Commission	$	3 29
Dec. 3.	Affidavit of value		1 20
Dec. 24.	Probate duty		25 48

ESTATE OF WILLIAM KIRCHER.

1919.			
Jan. 2.	To R. Matthews	$	27 00
	St. George's Hospital		17 50
	M. Davis		80 00
	J. A. Campbell & Co.		30 20
	Commission		27 87
	Sundries		2 50

ESTATE OF ELI KOUTICH.

1919.			
Jan. 10.	To T. Edwards Co.	$	44 16

ESTATE OF ZENOVIUS KRAWTCHOUK.

1919.			
Mar. 3.	To General Hospital	$	1 50
Dec. 18.	Harron Bros.		77 00

ESTATE OF JOHN KALLONEN.

1919.			
Mar. 3.	To Commission	$	5 20
May 12.	T. J. Kearney & Co.		81 00
	Sundries		85

ESTATE OF ERIC KLEMET.

1919.			
Feb. 4.	To Commission	$	5 09
Mar. 3.	Mount Pleasant Undertakers		48 00
April 2.	"Daily Sun"		5 00
	Congdon, Campbell & Meredith		26 80
	Sundries		1 35

ESTATE OF DAVID KOTTI.

1919.			
Mar. 3.	To Commission	$	3 50
April 2.	Nunn, Thomson & Clegg		55 00
	Sundries		35

ESTATE OF K. KAWASAKI.

1919.			
May 7.	To Commission	$	1 15
	Sundries		35

ESTATE OF JOHN KEMPHOUSON.

1919.			
June 2.	To Dr. D. R. Shewan	$	20 00
	Probate duty		56 71
	Commission		73 27
June 6.	Wilson & Jamieson		75 90
June 17.	"The World"		20 40
	Sundries		3 00

ESTATE OF JOHN KENNEY.

1919.			
Aug. 4.	To George Hoy	$	695 00
	Commission		85 28
Aug. 23.	S. Ogawa		150 00
	Sundries		5 80

ESTATE OF MAAT LATICA.

1919.			
Nov. 11.	To S. Letica	$	269 11
	Mike Letica		269 11

ESTATE OF THOMAS LITTLE.

1919.			
Aug. 20.	To Taxes, Lot 34, Bk. 241, D.L. 544	$	14 15

CR.

ESTATE OF THOMAS G. KITSON.

1919.			
July 2.	By Lot 6, S.W. ¼ Sec. 25, Tp. 8	$	201 08
	Refund of taxes		1 69

ESTATE OF JOHN KALLONEN.

1919.			
Jan. 20.	By Cash	$	41 15
Feb. 25.	Wages		63 00
Sept. 29.	Effects		9 00

ESTATE OF ERIC KLEMET.

1919.			
Jan. 14.	By Cash	$	36 90
Feb. 28.	Royal Bank		65 16

ESTATE OF DAVID KOTTI.

1919.			
Feb. 28.	By Cash	$	70 00

ESTATE OF K. KAWASAKI.

1919.			
Feb. 26.	By Wages	$	23 24

ESTATE OF JOHN KEMPHOUSON.

1919.			
May 8.	By Lot 44, Bk. 12, D.L. 352	$	300 00
May 13.	Royal Bank		65 34
	Bank of Montreal		1,039 60
	Cash		60 40

ESTATE OF JOHN KENNEY.

1919.			
July 31.	By Effects	$	8 00
	Launch		1,400 00
Aug. 6.	Logs		297 53

ESTATE OF GUSTAV A. KARZONINKAT.

1919.			
Oct. 20.	By Lot 12, Bk. 1, S.E. ¼ Sec. 21.	$	25 00

DR.

ESTATE OF GUSTAVUS LINDGREN.

1919.			
Feb. 2.	To Taxes, Lot 9, Bk. 295½, Lot 159	$	22 15
	Commission		2 25
Mar. 14.	Corporation of Burnaby		1 75
July 15.	Taxes, Lot 9, Bk. 295½, Lot 159		6 83

ESTATE OF LAL SINGH.

1919.			
Feb. 13.	To Darling & Noble	$	10 00
April 2.	Commission		14 12
Aug. 4.	Griffith Jones		50 00

ESTATE OF CHARLES LIND.

1919.			
Jan. 2.	To Commission	$	20 05
Feb. 3.	"Daily Sun"		27 30
Mar.	Emil Peterson		10 00
	Sundries		2 93
July 1.	Alexandra Eklof		441 95

ESTATE OF RALPH C. LYON.

1919.			
Feb. 12.	To Dickie & DeBeck	$	26 95
	Commission		4 75
	Sundries		35

ESTATE OF ERNEST LUNDIN.

1919.			
April 2.	To J. A. MacInnes	$	47 15
	"The World"		7 50
	Probate duty		5 71
	Commission		53 83
	Sundries		5 20

ESTATE OF BOUSAK LARSEN.

1919.			
Mar. 12.	To A. C. Brydone-Jack	$	26 50
April 2.	Independent Undertakers		75 00
April 9.	"The World"		7 20
June 27.	Probate duty		1 44
	Commission		10 86
	Sundries		3 05
	C. B. Stahlschmidt		95 54

ESTATE OF ADOLPH LARSON.

1919.			
April 2.	To Commission	$	5 24
May 1.	Bourne & McDonald		27 10
	Adolph Larson		68 61
	Sundries		2 60

ESTATE OF GEORGE LISCUMBE.

1919.			
June 6.	To Dr. A. J. Brown	$	7 00
	Farris & Emerson		36 75
June 27.	F. D. Boucher		210 00
	"Daily Sun"		16 20
	Harron Bros.		162 00
	Commission		54 49
	Sundries		3 50

ESTATE OF HUGH A. MURRAY.

1919.			
Oct. 4.	To Commission	$	7 90

ESTATE OF AMADEE MELOCHE.

1919.			
Nov. 28.	To Commission	$	28 67
	Probate duty		200 97
	Succession duty		775 92
	National Trust Co.		25 00
	Sundries		1 00

CR.

ESTATE OF GUSTAVUS LINDGREN.

1919.			
April 30.	By S.E. ¼ Sec. 21	$	45 15

ESTATE OF LAL SINGH.

1919.			
Mar. 25.	By A. H. MacNeill	$	282 44

ESTATE OF RALPH C. LYON.

1919.			
Jan. 20.	By Wages	$	78 65
Feb. 21.	Effects		16 40

ESTATE OF ERNEST LUNDIN.

1919.			
Mar. 10.	By Wages	$	55 37
Mar. 31.	Royal Bank		452 86
July	Lots 1, 2, 6, 7, 9, 11, 12, and 13, S.E. ¼ Sec. 11		500 00
Sept. 26.	P.O. savings		62 15

ESTATE OF BOUSAK LARSEN.

1919.			
Feb. 5.	By Cash	$	46 00
Feb. 6.	Wages		69 78
Mar. 7.	Bank of Commerce		101 53
June 4.	Imperial Bank		2 28

ESTATE OF ADOLPH LARSON.

1919.			
Mar. 20.	By Standard Bank	$	100 75
	Effects		4 00
June 30.	Watch		6 00

ESTATE OF GEORGE LISCUMBE.

1919.			
April 23.	By Cash	$	19 62
	Wages		29 87
May 28.	Merchants Bank		329 70
	Victory bonds		308 88
July 31.	"		201 75

ESTATE OF CHARLES LACEY.

1919.			
Nov. 6.	By Effects	$	10 30

ESTATE OF JAMES LYNCH.

1919.			
Dec. 12.	By Bank of Commerce	$	435 51

ESTATE OF ELIZABETH A. LAWLEY.

1919.			
Dec. 13.	By Lot 20, Bk. 166, D.L. 526	$	50 00

ESTATE OF LAM SING.

1919.			
Dec. 29.	By Cash	$	1,735 85

ESTATE OF HUGH A. MURRAY.

1919.			
Sept. 15.	By W. ½ Lot 6, Bk. 145, D.L. 264A	$	150 00

ESTATE OF AMADEE MELOCHE.

1919.			
Nov. 28.	By Lots 11, 12, and 13, Bk. 34, Edmonton	$	573 45

DR.

ESTATE OF PETER I. MOORE.

1919.			
July 21.	To Water rates	$	7 65
Aug. 23.	Taxes, Lots 1 and 2, Bk. 6, D.L. 302		183 44
Sept. 2.	Commission		7 75
Oct. 4.	McPhillips & Smith		75 00

ESTATE OF WM. MULHOLLAND.

1919.			
Jan. 22.	To Margaret Mulholland	$	12 48

ESTATE OF EDMUND H. MEREDITH.

1919.			
Jan. 2.	To Perry & Mack	$	46 50
Jan. 10.	McAdie Undertakers		57 00
Feb. 3.	"Daily Sun"		26 25
	Commission		9 47
	Sundries		1 50
Nov. 5.	Irene Feltham		19 23

ESTATE OF LENA G. MATCHETT.

1919.			
Feb. 3.	To "Daily Sun"	$	11 25
May 1.	Centre & Hanna		130 00
Aug. 12.	Probate duty		1 81
	Sundries		1 20

ESTATE OF GIUSEPPE MAZZATTI.

1919.			
Feb. 3.	To Harron Bros	$	72 00
	G. R. Long		35 75
	General Hospital		12 00
Feb. 13.	"The World"		8 77
Dec. 9.	Probate duty		2 27
	Commission		15 52
	Sundries		2 55
Dec. 12.	Italian Consul		162 92

ESTATE OF FRANK MATSON.

1919.			
Jan. 10.	To "The World"	$	12 82
	Probate duty		21 59
	Sundries		1 20

ESTATE OF JAMES MACKINNON.

1919.			
Jan. 2.	To Dr. O. S. Large	$	45 00
Feb. 3.	T. J. Kearney & Co.		192 25
Mar. 12.	Farris & Emerson		31 75
Sept. 19.	Probate duty		1 53
	Commission		19 50
	Sundries		1 55
Oct. 24.	Henry Mackinnon		99 07

ESTATE OF T. W. MILLS.

1919.			
Jan. 2.	To Commission	$	2 06
	Sundries		35
	J. Murray		30 00

ESTATE OF MILE MARICH.

1919.			
Jan. 2.	To Tudor Marich	$	506 20
	Robert Willson		8 00
	Trevor Bagot		10 00
	Quathiaski Canning Co.		25 00
	"Daily Province"		29 60
	McTaggart & Ellis		27 60
	Commission		58 09
	Sundries		2 00

ESTATE OF J. MIRKOVICH.

1919.			
Jan. 2.	To Commission	$	1 07
	Sundries		35
Feb. 13.	Marh Mirkovich		19 97

ESTATE OF CHARLES S. MANBY.

1919.			
July 18.	To Taxes and interest, Lots 5 and 6, Bk. 6, D.L. 464	$	15 88

ESTATE OF JAMES MAZOTTI.

1919.			
Feb. 4.	To Commission	$	10 55
	Sundries		35
	F. T. Cornwall		200 15

CR.

ESTATE OF PETER I. MOORE.

1919.			
Dec. 1.	By Rents, 462 Dufferin Street	$	180 85

ESTATE OF LESLIE J. MORAN.

1919.			
Nov. 3.	By Rent, 140 Eighth Ave. E.	$	60 00

ESTATE OF GIUSEPPE MAZZATTI.

1919.			
Jan. 27.	By Bank of Commerce	$	201 42
	Wages		34 16
Feb. 4.	Effects		1 50

ESTATE OF JAMES MACKINNON.

1919.			
Mar. 3.	By P. Roberts	$	90 15
April	Effects		50

ESTATE OF MILE MARICH.

1919.			
April 19.	By Wages	$	32 70

ESTATE OF JAMES MAZOTTI.

1919.			
Jan. 10.	By Cash	$	22 85
	Wages		158 20
	P.O. order		30 00

DR.

ESTATE OF GERHARD MOHRING.

1919.			
May 6.	To W. D. Gillispie	$	57 20
	Probate duty		21 80
May 12.	D. Clausen		43 63
	Freight and cartage		11 52
May 16.	"Daily Province"		9 90
July 11.	Nunn, Thomson & Clegg		113 00
	Taxes, Lot 43, Bk. 6, D.L. 70		10 28
	Commission and sundries		31 57

ESTATE OF ERNEST A. MORGAN.

1919.			
Aug. 4.	To Taxes, Lot 1, Bk. 1, D.L. 11	$	44 93
	Probate duty		22 73
	"The World"		23 80
	Commission		64 68
	Deacon & Latta		130 07
	Harold Armitage		15 00
	Wright Investment Co.		5 00
	Chester Bowlsby		150 00
Sept. 2.	Taxes, Lot 1, Bk. 1, D.L. 11		2 36
Dec. 3.	"Daily Province"		3 85
	Sundries		1 50

ESTATE OF LOUIS MANSON.

1919.			
July 2.	To Dickie & DeBeck	$	39 40
	T. J. Kearney & Co.		100 00
	Commission		28 71
Aug. 4.	"The World"		10 35
Nov. 21.	Taxes, Lots 5 and 6, Bk. 76, D.L. 301		16 50
	Sundries		1 50

ESTATE OF ISAAC MILLER.

1919.			
Dec. 3.	To Brooks, Scanlon & O'Brien	$	3 80

ESTATE OF BENJAMIN MITCHELL.

1919.			
Dec. 3.	To Commission	$	42 90
	Tupper & Bull		67 30
	"Daily Sun"		19 60
	Annie Mitchell		.....
	Sundries		1 50

ESTATE OF PATRICK MCCABE.

1919.			
June 6.	To Taxes, Lots 7, 8, Bk. 105, D.L. 37	$	26 40
June 27.	S. H. Henderson		100 00
	Commission		8 00
	Notary fee		50

1919. ESTATE OF DUNCAN MCLEOD.

June 6.	To Taxes, Lots 4 and 6, Bk. 1, D.L. 648	$	29 98

ESTATE OF DUNCAN MCDOUGALL.

1919.			
April 2.	To Insurance premium	$	17 30
April 26.	"		16 30
May 16.	"		17 00
Oct. 4.	Interest on mortgage		87 50
	Commission		11 60

1919. ESTATE OF GEORGE E. MCCAULLEY.

April 2.	To Affidavit of value	$	1 20
	Probate duty		1 02
	A. P. McCauley		45 25

1919. ESTATE OF JAMES G. MCNEILL.

Feb. 3.	To T. J. Kearney & Co.	$	171 00
	Dr. W. D. Patten		15 00
	"Daily Province"		10 40
	A. J. Kappeb		34 05
	Commission		28 63
June 17.	Probate duty		19 33
	Sundries		2 70

1919. ESTATE OF ROBERT MCCAUGHEY.

Feb. 12.	To A. C. Brydone-Jack	$	34 75
Mar. 3.	"Daily Sun"		18 20
	Dr. M. M. McKay		37 50
	Nunn, Thomson & Clegg		165 50
	R. B. Ellis		104 70

CR.

ESTATE OF GERHARD MOHRING.

1919.			
April 30.	By Bank of Montreal	$	561 47
May .	Workmen's Compensation		46 92

ESTATE OF ERNEST A. MORGAN.

1919.			
July 22.	By Life insurance	$1,293 54	

ESTATE OF LOUIS MANSON.

1919.			
July 16.	By Bank of Commerce	$	574 22

1919. ESTATE OF ISAAC MILLER.

June 24.	By Cash	$	3 16

ESTATE OF BENJAMIN MITCHELL.

1919.			
Nov. 12.	By Union Bank	$	858 06
Dec. 8.	Royal Bank		14 81

ESTATE OF CASPER MILLER.

1919.			
Dec. 12.	By Effects	$	2 50
	Cash		339 02

ESTATE OF PATRICK MCCABE.

1919.			
June 24.	By Lots 7, 8, Bk. 105, D.L. 37	$	100 00
Dec. 3.	" " "		75 00

ESTATE OF DUNCAN MCDOUGALL.

1919.			
Dec. 18.	By Rents	$	393 83

1919. ESTATE OF JAMES G. MCNEILL.

Jan. 6.	By Billiard-tables, etc.	$	200 00
Jan. 25.	Bank of Hamilton		372 66

1919. ESTATE OF ROBERT MCCAUGHEY.

Jan. 13.	By Cash	$	60 85
Feb. 6.	Merchants Bank		2,003 20

DR.

ESTATE OF ALFRED McDONALD.

1919.			
June 2.	To Ellis & Brown	$	38 98
	"Daily Sun"		23 40
	Commission		31 28
	Affidavit of death		5 00
	Sundries		1 35

ESTATE OF JOHN McLEOD.

1919.			
April 2.	To "Daily Province"	$	18 70
	Centre & Hanna		31 50
	Congdon, Campbell & Meredith		56 60
	Commission		481 32
May 23.	Roderick McLean		100 00
Sept. 2.	Patterson, Chandler & Co.		99 00
Sept. 19.	Probate duty		192 51
	Succession duty		471 68
Dec. 3.	Alexander McLean		680 65
	Annie McLean		680 65
	Mary McLean		680 65
	Donald McLeod		2,041 45
	Alex. McLeod		2,041 45
	Hugh McLeod		2,041 46
	Sundries		7 20

ESTATE OF ALFRED McDONALD.

1919.			
April 2.	To Sundries	$	1 35
June .	Ellis & Brown		38 98
	Affidavit of death		5 00
June 27.	"Daily Sun"		23 40
	Commission		31 28

ESTATE OF FRANCES McGILLIVNAY.

1919.			
April 2.	To E. Heath	$	17 60
	McTaggart & Ellis		20 00
May 6.	Mount Pleasant Undertakers		140 00
May 22.	Burnett, Gluck & Co.		49 65
	Dr. W. A. Moffatt		17 70
	H. A. McDonald		149 35
	M. Gallerns		78 15
	Commission		25 00
	Sundries		2 55

ESTATE OF JOHN McAFFEE.

1919.			
June 2.	To M. A. Macdonald	$	66 70
June 27.	"Daily Sun"		18 20
Oct. 4.	Probate duty		16 83
	Commission		58 29
	Sundries		2 70
Oct. 24.	Robert McAffee		111 45
	Thomson Houston		111 45
	Mary Pinkney		111 45
	Ida McAffee		111 45
	Bertha McAffee		111 45
	Phoebe I. Fitzsimmons		111 45
	Joseph McAffee		111 45
	Mrs. Isabella McAffee		111 45

ESTATE OF GEORGE W. NEAP.

1919.			
June 6.	To Taxes, Lots 22, 35, Bk. 2, 1, D.L. 708	$	24 96

ESTATE OF ERNEST NELSON.

1919.			
Jan. 11.	To Probate duty	$	35 62
	Affidavit of value		1 20

ESTATE OF JOHN NOONAN.

1919.			
Mar. 3.	To Commission	$	4 66
Nov. 31.	"Daily Province"		9 45
	Sundries		1 35

ESTATE OF CELESTE NEGRIN.

1919.			
Sept. 2.	To C. L. Filmore	$	23 55
Oct. 4.	"The World"		10 35
Nov. 21.	G. Negrin		154 00
	Commission		37 54
	Sundries		50

ESTATE OF CARL OTTOSON.

1919.			
Mar. 12.	To Savage & Roberts	$	24 45
Aug.	Probate duty		5 00
	Commission		4 39
	Sundries		2 20

CR.

ESTATE OF ALFRED McDONALD.

1919.			
Mar. 1.	By Cash	$	40 00
	Effects		5 00
May 23.	Wages		151 15
	Bank of Commerce		429 47

ESTATE OF JOHN McLEOD.

1919.			
Mar. 28.	By Bank of Montreal	$1,074	30
		6,290	00
	Bank of Commerce	1,355	27
June 6.	Cash	906	75

ESTATE OF ALFRED McDONALD.

1919.			
Mar. 1.	By Cash	$	40 00
Mar. 11.	Effects		5 00
May 23.	Wages		151 15
	Bank of Commerce		429 47

ESTATE OF FRANCES McGILLIVNAY.

1919.			
Mar. 10.	By Life insurance	$	500 00

ESTATE OF JOHN McAFFEE.

1919.			
May 13.	By Standard Bank	$1,165	74

ESTATE OF JOHN NOONAN.

1919.			
Jan. 22.	By Potatoes	$	6 00
	Stock		87 22
Nov. 6.	Remittance		7 84
Dec. 11.	Royal Bank		562 33

ESTATE OF CELESTE NEGRIN.

1919.			
Aug. 29.	By Bank of Montreal	$	596 75
Sept. 5.	„		154 15

DR.

ESTATE OF TYCKO OGREN.

1919.			
Jan. 2.	To McGill & Grant	$	41 60
	"Daily Province"		10 45
	T. A. Wilson		5 00
	General Hospital		13 50
	Harron Bros.		30 00
May 22.	Ivan Ogren		35 00
	Commission		15 19
	Sundries		1 50

ESTATE OF NELS OLSON.

1919.			
Oct. 20.	To E. A. Halliday	$	2 50
Nov. 21.	G. R. Long		22 90
	"Daily Sun"		11 20
	Commission		9 85
	Sundries		50

ESTATE OF PIETRO D. ODORICA.

1919.			
Oct. 4.	To Dr. D. A. Tomsett	$	100 00
	N. P. Buckingham		24 05
	Armstrong & Hotson		113 50
Nov. 3.	"Daily Sun"		14 50
Dec. 9.	Dodorico Purna		40 89
	Commission		15 55
	Sundries		1 50

ESTATE OF GUSTAF OSBERG.

1919.			
Nov. 3.	To T. J. Kearney & Co.	$	28 00
	Commission		7 37
	Sundries		50

ESTATE OF PETER O. PETERSON.

1919.			
April 2.	To Commission	$	53 28
	Copy of Court order		1 00
Dec. 12.	Peter O. Peterson, Sr.		3,012 57

ESTATE OF ALBERT PATNAUD.

1919.			
Jan. 2.	To Commission	$	1 78
	T. Edwards Co.		55 22

ESTATE OF HANS J. PETERSON.

1919.			
Jan. 2.	To St. Paul's Hospital	$	8 40
	Commission		8 68
Feb. 3.	Dr. S. Blumberger		35 00
Feb. 13.	Perry & Mack		121 17
	Sundries		35

ESTATE OF JOHN PETERSON.

1919.			
Feb. 4.	To Commission	$	14 45
	Nunn, Thomson & Clegg		131 50
Mar. 27.	Dr. D. M. Mackay		20 00
April 2.	Ellis & Brown		33 20
	Sundries		35

ESTATE OF THOMAS H. PERKINS.

1919.			
Mar. 12.	To Ellis & Brown	$	32 10
Mar. 27.	Dr. A. S. Murphy		20 00
April 2.	Emily E. Perkins		410 00
	"Daily Province"		13 00
June 20.	T. Edwards Co.		145 25
	Probate duty		21 11
	Commission		134 34
	Sundries		3 55
Dec. 9.	John Perkins		1,907 62

ESTATE OF WALTER J. PINKERTON.

1919.			
Mar. 3.	To G. R. Long	$	23 85
	Perry & Mack		139 41
	Commission		8 72
	Sundries		1 35

ESTATE OF CHARLES H. PURCHASE.

1919.			
May 1.	To Water rates	$	3 75
May 6.	Russell & Co.		41 55
	Harron Bros.		143 00

CR.

ESTATE OF NELS OLSON.

1919.			
Aug. 4.	By Cash	$	196 90

ESTATE OF PIETRO D. ODORICA.

1919.			
Oct. 1.	By Bank of Commerce	$	311 19

ESTATE OF GUSTAF OSBERG.

1919.			
Oct. 7.	By Cash	$	25 00
	Wages		115 38
	Effects		7 00

ESTATE OF PETER O. PETERSON.

1919.			
Mar. 12.	By Promissory note	$1,065 75	

ESTATE OF JOHN PETERSON.

1919.			
Jan. 22.	By Cash	$	276 10
	Effects		13 00

ESTATE OF THOMAS H. PERKINS.

1919.			
Jan. 10.	By Cash	$	118 60
Mar. 7.	Royal Bank		604 25
April 27.	Sun Life Assurance Co.		1,964 12

ESTATE OF WALTER J. PINKERTON.

1919.			
Feb. 26.	By Bank of Montreal	$	174 53

ESTATE OF CHARLES H. PURCHASE.

1919.			
Mar. 18.	By Cash	$	3 58
	Rent		5 00
April 30.	Hillier Estate		150 00
May 3.	Bank of Montreal		32 39
Oct. 7.	Remittance	$	3 90
Nov. 4.	"		7 95
Dec. 4.	"		5 70
Jan. 1.	"		5 70

DR.

ESTATE OF BAPTISTE PROVOST.

1919.			
June 2.	To A. D. Fleishman	$	26 77
	"The World"		7 20
	T. Edwards Co.		103 00
	John Carelli		59 47
	Commission		10 53
	Sundries		3 55

ESTATE OF JOHN W. PEARSE.

1919.			
July 2.	To "Daily Sun"	$	9 45
	Savage & Roberts		84 75
	Commission		59 67
	W. J. Twiss		120 72
	Sundries		1 75
	M. G. Pearse		305 71
	M. C. Pearse		203 80
	R. W. Pearse		203 81
	J. W. Pearse		203 81

ESTATE OF CLAUDE C. PURDY.

1919.			
Aug. 4.	To "Daily Sun"	$	8 70

ESTATE OF JAMES PATERSON.

1919.			
Sept. 2.	To C. L. Filmore	$	24 90
	Sundries		1 50

ESTATE OF JAMES ROBERTSON.

1919.			
June 6.	To Taxes, Lots 17, 18, Bk. 8, D.L. 657	$	23 35
	Taxes, Lots 16, 17, Bk. 4, D.L. 654		25 84

ESTATE OF FRANCIS J. RAINE.

1919.			
Jan. 2.	To Registering fee	$	17 00
Jan. 10.	T. D. Calland & Co.		10 00
	Davis & Co.		158 76
Feb. 3.	Taxes, L and M, Lots 1, 2, and 3, Bk. 2, D.L. 192		242 55
	Taxes, L and M, Lots 1, 2, and 3, Bk. 2, D.L. 192		9 76
Mar. 17.	T. H. Calland & Co.		100 00
May 12.	J. Z. Hall, mortgage		524 50
June 17.	Davis & Co.		252 85
June 27.	Taxes, Sub. A, Sec. 30, R.W. 6		1 64
July 17.	Taxes, Lot 4A, Sec. 30, Bk. 4		7 72
	Taxes, Lots 8, 9, E. ½ Sec. 10, Bk. 26, D.L. 201		7 60
Sept. 2.	T. H. Calland		100 00
Sept. 12.	Taxes, Lots 1 to 3, Bk. L and M, Lot 2, D.L. 192		72 80
	Taxes, H and J, Bk. L and M, Lot 2, D.L. 192		136 92
	Taxes, G, Bk. L and M, Lot 2, D.L. 192		69 05
Nov. 21.	Taxes, N and P, Lots 1, 2, and 3, Bk. 2, D.L. 192		71 77
	Commission		144 76
	Sundries		3 00

ESTATE OF JOHN ROBB.

1919.			
April 9.	To Orr Bros.	$	7 80
April 26.	"Daily Province"		22 40
May 1.	Orr Bros.		2 10
	Campbell & Grill		7 10
May 12.	Sterling & Co.		35 90
	Water rates		7 65
Oct. 22.	Taxes, Lot 26, Bk. 91, D.L. 541		82 90
Dec. 31.	Bishop, Gaskell & Co.		6 50
	Commission		7 87

ESTATE OF JAMES ROBB.

1919.			
Mar. 17.	To A. Robb	$	609 01

ESTATE OF JOHN ROSE.

1919.			
Feb. 3.	To "Daily Sun"	$	27 30
	Dr. D. M. Mackay		5 00
	General Hospital		1 50
April 2.	Write Investment Co.		19 75
	Commission		19 15
	Sundries		1 00

CR.

ESTATE OF BAPTISTE PROVOST.

1919.			
April 29.	By Cash	$	5 05
May 20.	War bond		205 47

ESTATE OF JOHN W. PEARSE.

1919.			
June 10.	By Mutual Life Insurance Co.	$	883 72
June 11.	Victory bond		309 75

ESTATE OF CLAUDE C. PURDY.

1919.			
July 23.	By Bank of Commerce	$	26 33

ESTATE OF JAMES PATERSON.

1919.			
July 30.	By Imperial Bank	$	5 32
Aug. 4.	Bank of Montreal		22 64

ESTATE OF FRANCIS J. RAINE.

1919.			
Jan. 8.	By Lots 1, 2, and 3, Bk. 12, D.L. 192	$	650 00
April 2.	Haslam mortgage		500 00
Nov. 3.	Lots 4 and 24, Lot 30, Bk. 4		395 00
Dec. 11.	Lots N and P, Lot 123, Bk. 2, D.L. 192		559 27
	Refund of taxes		4 29
	Rents and interest on mortgage		418 37
	Refund, Davis & Co.		87 25

ESTATE OF JOHN ROBB.

1919.			
Oct. 19.	By Rent and interest	$	124 00
Dec. 4.	Remittance		15 00

ESTATE OF JOHN ROSE.

1919.			
April 4.	By Logs	$	233 19
June 20.	Dominion Life Insurance Co.		150 00

DR.

ESTATE OF JACOB ROSENSTOCK.

1919.			
Jan. 2.	To Dickie & DeBeck	$	45 65
	Independent Undertakers		80 00
Feb. 3.	General Hospital		4 50
Mar.	S. Gintzberger		25 00
Aug. 12.	Probate duty		12 58
	Commission		67 16
	Sundries		4 45

ESTATE OF OLAF RUDE.

1919.			
Jan. 2.	To Commission	$	1 07
	Sundries		35
	Independent Undertakers		20 08

ESTATE OF ARTHUR RONEY.

1919.			
Feb. 13.	To McTaggart & Ellis	$	29 00
	"Daily Sun"		23 40
	Evans Roney		558 00
	Commission		61 63
	Sundries		2 50

ESTATE OF WINCENT RYBREZKA.

1919.			
Mar. 3.	To G. S. Hall	$	6 00
	Harron Bros.		82 00
	Harris, Bull & Mason		43 90
May 12.	"The World"		11 70
	Commission		94 82
	Sundries		50

ESTATE OF JOHN REILLY.

1919.			
Oct. 4.	To McGill & Coady	$	64 20
	St. Paul's Hospital		15 00
	T. J. Kearney & Co.		100 00
	"Daily Sun"		21 00
	Commission		116 43
	Sundries		50

ESTATE OF SAMUEL ST. ONGE.

1919.			
Sept. 4.	To Taxes, Lots 23 and 24, Bk. 18, D.L. 202	$	39 05
	Sundries		50

ESTATE OF HERMANN SCHWARZ.

1919.			
Jan. 2.	To Mrs. M. Gordon	$	20 00
Mar. 3.	Water rates		3 46
	M. Gordon		40 00
April 3.	"		30 00
May 6.	"		45 00
May 16.	Water rates		3 86
June 2.	M. Gordon		35 00
Aug.	"		45 00
Sept. 2.	Taxes, N. ½ Lot 11, Bk. 637, D.L. 472		18 62
	M. Gordon		210 00
	McTaggart & Ellis		47 62
	" "		43 00
Sept. 16.	M. Gordon		100 00
Sept. 19.	Taxes, Lot 3, Bk. 39, D.L. 301		53 38
Oct. 6.	McTaggart & Ellis		153 65
Oct. 20.	M. Gordon		45 00
Nov. 3.	"		30 00
	Insurance on Twentieth Ave. East		24 00
Nov. 21.	Sterling & Co.		250 00
	M. Gordon		50 00
	"		30 00
	Commission		73 70

ESTATE OF GEORGE STEPHENSON.

1919.			
Jan. 2.	To Commission	$	5 25
	Registering deed		5 00

ESTATE OF OSCAR SIDDONS.

1919.			
Feb. 3.	To L. M. Siddons	$	19 20

CR.

ESTATE OF JACOB ROSENSTOCK.

1919.			
Mar. 14.	By Dime Savings Bank, New York	$	658 91

ESTATE OF ARTHUR RONEY.

1919.			
Jan. 31.	By Bank of Nova Scotia	$	272 62
	Royal Bank		960 11

ESTATE OF WINCENT RYBREZKA.

1919.			
Feb. 13.	By Cash	$	1,896 40

ESTATE OF JOHN REILLY.

1919.			
Sept. 17.	By Cash	$	245 27
Oct. 30.	St. Paul's Hospital		2,083 35

ESTATE OF HERMANN SCHWARZ.

1919.			
Dec. 20.	By Rent and interest	$	413 00
Aug. 28.	N. ½ Lot 11, Bk. 637, D.L. 472		1,000 00

ESTATE OF HENRY SHAPCOTT.

1919.			
Jan. 17.	By Lot 37, Bk. 1, D.L. 332	$	150 00

ESTATE OF ALEXANDER SALO.

1919.			
Jan. 2.	By Effects	$	5 00

DR.

ESTATE OF ISABELLA M. SPEIRS.

1919.			
Jan. 22.	To B. J. Noyles	$	4 55
April 2.	Wright Investment Co.		19 75
July 18.	"Daily Province"		7 05
Aug. 4.	Credit Foncier F.C.		105 00
Nov. 3.	A. H. Gordon		26 00
	Taxes, Lots 17 and 18, Bk. 465, D.L. 526		77 24
Nov. 21.	Credit Foncier F.C.		105 00
	Commission		26 07
	Sundries		1 00

ESTATE OF EMIL STYRIS.

1919.			
April 2.	To Affidavit of value	$	1 20
May 22.	Probate duty		32 77

ESTATE OF HELMER G. SJOHOIM.

1919.			
Jan. 10.	To J. Irvin	$	16 60
Jan. 22.	G. H. Clement		25 00
Feb. 3.	Russell, Hancox & Co.		40 05
	"The World"		8 45
	Commission		8 30
	Sundries		1 00

ESTATE OF JOHN SODERBERG.

1919.			
Jan. 2.	To Dr. F. N. Robertson	$	15 00
	C. W. Saners		31 40
Jan. 10.	John Alexson		50 00
	G. W. Hamilton		130 00
	"Daily Sun"		26 25
	Frances Slexson		126 90
	Commission		27 55
	Sundries		2 00

ESTATE OF BOMFACIO SANTUCI.

1919.			
Jan. 2.	To Commission	$	3 30
	Bernardina Santuci		62 30
	Sundries		35

ESTATE OF W. STOLNACK.

1919.			
Jan. 16.	To General Hospital	$	7 50
May 17.	Harron Bros.		75 00
Sept. 2.	Dr. F. H. Tronsdale		11 00
	Commission		5 45
	Sundries		35

ESTATE OF IGNACE SANGOLA.

1919.			
Jan. 2.	To Perry & Mack	$	80 00
	General Hospital		1 50
	R. J. Stetson		5 78
	Commission		4 61
	Sundries		35

ESTATE OF FRED SAHLK.

1919.			
Feb. 3.	To T. J. Kearney & Co.	$	150 00
	McTaggart & Ellis		30 15
	"Daily Sun"		27 30
	Commission		38 87
	Sundries		2 70

ESTATE OF WILFRID C. SMITH.

1919.			
Feb. 3.	To Electric light	$	4 26
Feb. 13.	"The World"		10 40
	M. A. Macdonald		59 40
	Perry & Mack		145 50
	D. D. Munro		30 00
April 9.	Patterson & Chandler		62 00
	Commission		49 76
	Sundries		3 00

ESTATE OF JOHN F. STALL.

1919.			
April 3.	To Frank Stall	$	21 35
	Commission		1 18
	Sundries		1 10

ESTATE OF EDWARD J. SAPSFORD.

1919.			
Feb. 3.	To Rent	$	7 00
	Mary Alexander		31 50
	W. J. H. Macdermott		35 00
Mar. 29.	G. R. Long		29 35
	N.Y. Outfitting Co.		13 00
April 9.	"The World"		9 00
	Commission		13 25
	Sundries		50

CR.

ESTATE OF ISABELLA M. SPEIRS.

1919.			
May 1.	By Royal Bank	$	14 56
July 10.	Furniture		80 00
Oct. 20.	House-rent		208 33

ESTATE OF HELMER G. SJOHOIM.

1919.			
Jan. 30.	By Imperial Bank	$	66 09

ESTATE OF JOHN SODERBERG.

1919.			
Feb. 26.	By Dominion bond	$	50 00

ESTATE OF W. STOLNACK.

1919.			
Jan. 16.	By Cash	$	7 50

ESTATE OF FRED SAHLK.

1919.			
Jan. 16.	By Bank of Commerce	$	758 54

ESTATE OF WILFRID C. SMITH.

1919.			
Jan. 15.	By Goods and effects	$	95 00
	Cash		23 10
	Merchants Bank		784 02
May 16.	„		93 25

ESTATE OF JOHN F. STALL.

1919.			
Jan. 23.	By Cheque	$	23 63

ESTATE OF EDWARD J. SAPSFORD.

1919.			
Jan. 29.	By Auto-truck	$	200 00
	Shop furniture		65 00
Feb. 11.	Store effects		5 00

DR.

ESTATE OF NEIL SOUSIE.

1919.			
Mar. 12.	To W. J. Baird	$	44 05
	Cassidy & Allen Co.		150 00
April 2.	Probate duty		4 56
	"Daily Sun"		5 00
	Commission		26 64
	Sundries		1 85
	George Susie		300 68

ESTATE OF UZUHIKI SAKAMOTO.

1919.			
Mar. 3.	To "Daily Sun"	$	6 60
	J. H. Evans		33 25
April 2.	Commission		15 00
	Sundries		1 35
April 26.	Narutaro O. Kukawa		242 60

ESTATE OF GEORGE A. SANGSTER.

1919.			
May 6.	To Russell, Hancox & Co.	$	39 50
	Sundries		7 45
	Commission		74 43

ESTATE OF EMIL SIREN.

1919.			
April 2.	To J. A. MacInnes	$	34 95
	"Daily Province"		9 45
Aug. 8.	Finnish Society		30 00
	Commission		56 55
	"		2 75
	Sundries		2 70

1919. ESTATE OF JOHN W. SAYERS.

June 17.	To Taxes, Lot 1, W. pt. 245	$	2 75
	Tupper & Bull		28 20
	Commission		17 75
	Sundries		2 35
	Susan Sayers		198 95

1919. ESTATE OF JOHN F. STARRY.

June 2.	To "Daily Province"	$	9 45
	McTaggart & Ellis		28 85
	Commission		82 69
	Sundries		2 50

ESTATE OF ACHILLES D. SAIROS.

1919.			
June 2.	To C. L. Filmore	$	19 65
July 24.	T. J. Kearney & Co.		73 55
	Commission		5 00
	Sundries		1 35

1919. ESTATE OF JOHN SPENCER.

Aug. 5.	To Commission	$	12 23
	Sundries		60
	Edgar C. Lunn		231 82

ESTATE OF WILLIAM SUTHERLAND.

1919.			
Sept. 2.	To "Daily Sun"	$	19 60
	Farris & Emerson		33 85
	T. Edwards Co.		223 40
	Commission		116 45
	Sundries		1 50

1919. ESTATE OF SUNDAR SINGH.

Sept. 2.	To N. R. Fisher	$	61 50
	Nunn, Thomson & Clegg		74 50
	Karlai Singh		40 00
	"Daily Province"		27 00
	Major Fisk		14 25
	Karlai Singh		30 00
	Commission		135 38
	Sundries		4 75

ESTATE OF CHARLES C. STORRICK.

1919.			
Sept. 4.	To McTaggart & Ellis	$	27 50
	"Daily Province"		21 60
Oct. 4.	Center & Hanna		226 50
	Commission		122 50
	Sundries		1 75

1919. ESTATE OF LEWIS SMITH.

Dec. 3.	To Commission	$	4 35
	Pacific Mills, Ltd.		47 63
	Joseph Oliver		13 95
	Sundries		1 35

CR.

ESTATE OF NEIL SOUSIE.

1919.			
Mar. 1.	By Bank of Montreal	$	532 78

ESTATE OF UZUHIKI SAKAMOTO.

1919.			
Feb. 8.	By Lannet	$	100 00
Mar. 6.	"		200 00

ESTATE OF GEORGE A. SANGSTER.

1919.			
Mar. 18.	By Cash	$	2 56
April 24.	Life insurance		989 63
May 2.	"		496 40

ESTATE OF EMIL SIREN.

1919.			
Mar. 28.	By Bank of Commerce	$1,130	91
April 11.	Wages		4 05
Aug. 4.	Cash and effects		51 00

1919. ESTATE OF JOHN W. SAYERS.

Mar. 11.	By Sun Life Insurance Co.	$	250 00

1919. ESTATE OF JOHN F. STARRY.

May 13.	By Imperial Bank	$	63 18
	"		1,590 65

ESTATE OF ACHILLES D. SAIROS.

1919.			
May 23.	By Bank of Toronto	$	99 75

1919. ESTATE OF JOHN SPENCER.

July 7.	By Cash	$	243 65
	Effects		1 00

ESTATE OF WILLIAM SUTHERLAND.

1919.			
July 24.	By Cash	$	47 00
Aug. 16.	Bank of Montreal		2,282 11

1919. ESTATE OF SUNDAR SINGH.

Aug. 27.	By Bank of Commerce	$1,652	32
Aug. 28.	Royal Bank		201 64
	Bank of Montreal		607 30
	Japan and Canadian Trust		246 45

ESTATE OF CHARLES C. STORRICK.

1919.			
Aug. 12.	By Wages	$	296 55
	Cash		115 00
	Expense		16 30
	Union Bank		2,022 60

1919. ESTATE OF LEWIS SMITH.

Aug. 7.	By Wages	$	1 00
	Effects		4 50
Nov. 29.	Bank of Commerce		81 40

1919. ESTATE OF GIOVANNI SILLANI.

Dec. 22.	By Bond coupons	$	7 50

DR.

ESTATE OF DOMINIQUE SEIN.

1919.			
Nov. 3.	To Ellis & Brown	$	26 50
	Commission		25 07
	Sundries		1 50
Dec. 9.	"The World"		10 35

ESTATE OF ROOR SINGH.

1919.			
Dec. 6.	To Commission	$	6 95

ESTATE OF WILLIAM J. SCOTT.

1919.			
Nov. 3.	To L. A. Howson	$	58 75
	F. J. Parkes		61 45
	Powell River Co.		111 47
	Farris & Emerson		31 35
Dec. 3.	"Daily Sun"		16 80
	Commission		28 42
	Sundries		3 00

ESTATE OF JOHN R. B. SMITH.

1919.			
Dec. 3.	To McTaggart & Ellis	$	23 40
	Dr. E. Grey		5 00
	Commercial Hotel		11 95
	"The World"		10 35
	Loss of proof papers		5 00
	Sundries		2 25
	Commission		17 32

ESTATE OF ELIZABETH S. SANSBURY.

1919.			
Dec. 3.	To Scrimgeour & Hogg	$	24 80
	Dr. J. W. Ford		30 00
	Mount Pleasant Undertakers		158 00
	Dr. McIntosh		5 00
	Commission		21 56
	Sundries		1 35

ESTATE OF GEORGE SATHER.

1919.			
Dec. 3.	To Perry & Mack	$	50 00
	Russell & Hancox		45 70
	"The World"		19 55
	Commission		153 70
	Sundries		1 75

ESTATE OF ANGUS SMITH.

1919.			
Dec. 18.	To Commission	$	1 33
	Sundries		35

ESTATE OF ISABELLA THOMPSON.

1919.			
Mar. 12.	To Taxes, Lot 8, Bk. 4, D.L. 555	$	5 82
Aug. 12.	Taxes, N. ½ Sec. 11, Bk. 6, D.L. 320		5 60

ESTATE OF FRED TENTELINK.

1919.			
Jan. 6.	To Affidavit of value	$	1 20

ESTATE OF ANGELO TETI.

1919.			
April 9.	To Eusibia Teti	$	50 00
May 1.	W. A. Brown		6 35
June 2.	Eusibia Teti		70 00
	Yorkshire & Canadian Trust		120 00
June 20.	Taxes, Lot 14, Bk. 4, D.L. 630		148 27
Aug. 4.	Eusibia Teti		30 00
Aug. 23.	W. J. Heaslip & Co.		150 00
Sept. 2.	Registering deed		18 00
	Stirling & Co.		250 00
	Latimer & Sons		20 55
Oct. 4.	Eusibia Teti		100 00
Oct. 6.	Yorkshire & Canadian Trust		120 00
	George Duncan		287 25
Oct. 8.	W. J. Heaslip & Co.		125 15
	W. A. Brown		16 75
	Stirling & Co.		250 00
	T. Mathew		72 00
	"		129 07
Oct. 20.	George Duncan		355 95
Oct. 24.	Fire insurance		114 00
Oct. 27.	Stirling & Co.		542 83
Nov. 4.	Eusibia Teti		50 00
Nov. 12.	Plate Glass Insurance		25 00
	Notary fee		50
Dec. 3.	Stirling & Co.		235 00
	Eusibia Teti		100 00
Dec. 24.	Yorkshire & Canadian Trust		135 00
	Commission		194 64
	Water rates		41 65

CR.

ESTATE OF DOMINIQUE SEIN.

1919.			
Oct. 17.	By E. S. Anthony	$	501 41

ESTATE OF ROOR SINGH.

1919.			
Nov. 27.	By Wages and cash	$	139 80

ESTATE OF WILLIAM J. SCOTT.

1919.			
Oct. 6.	By Boat	$	100 00
	Rifle		24 85
	Wages		230 89
Nov. 10.	Molsons Bank		105 74
Dec. 19.	War bond		106 72

ESTATE OF JOHN R. B. SMITH.

1919.			
Nov. 16.	By Merchants Bank	$	288 40
	Effects		13 00

ESTATE OF ELIZABETH S. SANSBURY.

1919.			
Nov. 15.	By Royal Bank	$	366 50
Nov. 22.	Wages		13 00
Dec. 18.	War bond		51 37

ESTATE OF GEORGE SATHER.

1919.			
Nov. 3.	By Cash	$	70 00
	Wages		340 79
	Effects		7 00
Nov. 27.	Bank of Montreal		2,656 10

ESTATE OF ANGUS SMITH.

1919.			
Nov. 10.	By Cash	$	26 65
Dec. 18.	War bond		53 02
	Effects		20 00

ESTATE OF NICK STOKAL.

1919.			
Dec. 23.	By Bank of Montreal	$	300 75
	Wages		32 40

ESTATE OF ISABELLA THOMPSON.

1919.			
April 4.	By Remittance	$	35 00
Oct. 23.	A. Clausen		43 00

ESTATE OF FRED TENTELINK.

1919.			
Feb. 11.	By P. D. Doak	$	934 07

ESTATE OF ANGELO TETI.

1919.			
Oct. 1.	By L. Griffiths, mortgage	$	3,000 00
	Rents and interest		1,188 56

DR.

ESTATE OF ANTON TRYKA.

1919.			
Jan. 22.	To "Daily Province"	$	15 70
Feb. 3.	Farris & Emerson		30 60
	Commission		64 21
	Sundries		2 50

ESTATE OF AUGUST TOMSKHE.

1919.			
Jan. 2.	To G. Jones	$	29 35
	Independent Undertakers		119 69
	"Daily Sun"		26 25
	Dr. S. Blumberger		21 25
	Commission		8 71
	Sundries		2 20

ESTATE OF DANIEL C. THOMPSON.

1919.			
Feb. 3.	To T. J. Kearney & Co.	$	776 00
Feb. 13.	St. Paul's Hospital		10 95
	Woods Hotel		7 00
	Freight, cartage, etc.		16 50
Aug. 4.	"Daily Province"		26 45
	Commission		149 61
	Sundries		3 40

ESTATE OF GEORGE H. VOGEL.

1919.			
Feb. 3.	To T. Edwards Co.	$	267 65
	Dickie & DeBeck		40 00
	"Daily Sun"		30 00
	Dickie & DeBeck		45 10
	James H. Baird		32 25
	Dr. T. H. Agnew		192 50
April 2.	J. P. Vibrail		176 75
May 6.	John Coleman		142 33
	Commission		51 07
	Sundries		2 50

ESTATE OF MAGNUS VIKESTAD.

1919.			
Mar. 12.	To Davis & Co.	$	78 95
	Dr. T. H. Trousdale		60 00
	H. T. Vikestad		215 50
	Taxes, Lots 13 and 14, Bk. 37 and 38		61 95
Oct. 4.	"Daily Sun"		19 60
	Commission		161 30
	Sundries		2 50

ESTATE OF PAULA VALSOVICH.

1919.			
April 2.	To Commission	$	7 05
	Sundries		1 75

1919.	ESTATE OF WILLIAM J. WINN.		
Aug. 5.	To Commission	$	12 50
	Taxes, Lots 10, 11, Lot 6, D.L. 2026		13 50
Aug. 23.	Taxes, Lots 6, 7, Lot 6, D.L. 2026		8 95
	Taxes, Lots 4, 5, Lot 6, D.L. 2026		26 95
	Taxes, Lot 9, Lot 6, D.L. 2026		9 48
	Daniel Winn		100 00
	Sundries		1 86

ESTATE OF GEORGE WHITTAKER.

1919.			
April 2.	To Affidavit of value	$	1 20
May 22.	Probate duty		99 32
Sept. 17.	Grote & Co.		4 00

1919.	ESTATE OF HENRY Q. WADE.		
Jan. 2.	To Commission	$	15 40
	"The World"		11 87
	T. J. Kearney & Co.		125 00
	Dr. T. H. Wilson		17 50
Oct. 4.	Probate duty		2 25
	Sundries		2 70
	Eliza E. Wade		165 35

ESTATE OF ROBERT T. WESTELL.

1919.			
July 1.	To T. M. Forknall	$	12 05
	Commission		2 50
	Sundries		35

1919.	ESTATE OF TOM WEAR.		
Aug. 4.	To "The World"	$	7 20
	Commission		7 51
	Harris, Bull & Mason		77 40

CR.

ESTATE OF ANTON TRYKA.

1919.			
Jan. 13.	By Union Bank	$	482 76
Jan. 20.	P.O. savings		793 70

ESTATE OF AUGUST TOMSKHE.

1919.			
Feb. 5.	By War bond	$	50 00

ESTATE OF DANIEL C. THOMPSON.

1919.			
Jan. 29.	By Cash	$	1,333 45
	Cheque		16 20
	Effects		50
July 15.	Merchants Bank		1,642 14

ESTATE OF GEORGE H. VOGEL.

1919.			
Jan. 15.	By Bank of Commerce	$	690 75
Mar. 7.	Royal Bank		230 65
	Automobile		100 00
June 30.	Watch		6 00

ESTATE OF MAGNUS VIKESTAD.

1919.			
Feb. 28.	By Dominion Bank	$	3,226 12

ESTATE OF PAULA VALSOVICH.

1919.			
Feb. 28.	By Cash	$	10 72
Mar. 18.	Bank of Montreal		139 30

1919.	ESTATE OF WILLIAM J. WINN.		
	By Lots 10, 11, Lot 6, D.L. 2026	$	250 00

ESTATE OF ROBERT T. WESTELL.

1919.			
June 2.	By Cash	$	50 00

1919.	ESTATE OF TOM WEAR.		
Aug. 2.	By Harris & Bull	$	150 20

DR.

ESTATE OF ALEXANDER WOOD.

1919.			
Dec. 3.	To Commission	$ 42	23
	Joseph Oliver	25	70
	B.C. Telephone Co.	10	72
	The S. Bowell Co.	40	00
Dec. 9.	"The World"	11	25
	Sundries	1	50

ESTATE OF YONG FONG.

1919.			
Nov. 4.	To Commission	$	82
	Sundries		13

CR.

ESTATE OF ALEXANDER WOOD.

1919.			
Sept. 15.	By Wages	$	9 00
Nov.	Bank of Commerce	835	69

ESTATE OF YONG FONG.

1919.			
Nov. 4.	By Cash	$	16 31

R. B. ELLIS,
Official Administrator.

COMOX ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF ALEX. PROULX.

1919.			
Jan.	To Court cost and bank exchange	$	5 95
	Probate duty		4 50
May 17.	Advertising		4 00
June 6.	O.A., commission on sale of land and stock		100 00
Aug. 25.	P. Harrison, fee		97 50
	Funeral expenses		188 05

ESTATE OF JOHN McCRAW.

1919.			
Feb. 17.	To Court, etc.	$	5 35
	Probate duty		21 03
April 16.	O.A., commission		21 00
	Solicitor's fees		20 00
April 29.	Grave-digging		7 00

ESTATE OF GEO. D. ROSS.

1919.			
April 16.	To O.A., commission	$	4 00
	Advertising		3 60
Oct. 9.	O.A., commission		5 50
Dec. 22.	Miss E. Ross		466 17

ESTATE OF EDWARD STEWART.

1919.			
April 16.	To O.A., commission, etc.	$	1 75
April 29.	Funeral expenses		10 00

ESTATE OF NEILS ANGUS SANDBERG.

1919.			
Oct. 8.	To Funeral expenses	$	30 50
Oct. 26.	O.A., commission		4 75

ESTATE OF MASKUKI MIGAMOTO.

1919.			
Jan. 23.	To Court costs	$	5 00
Feb. 26.	O.A., commission		50 00
	Solicitor's fees		20 00
	Advertising		4 00
	Mrs. Migamoto		921 00

ESTATE OF MALCOLM NEWBERG.

1919.			
	To Funeral expenses	$	10 00
	Court costs and telegrams		5 15
	Probate duty		2 15
	O.A., commission		11 50

ESTATE OF GEO. WILLIAMS.

1919.			
Mar. 4.	To Drawing up new deed, etc.	$	7 50
June 24.	Taxes on land		3 54

ESTATE OF FREDERIC JOSS.

1919.			
July 10.	To Taxes on land	$	18 95
Sept. 11.	„ „		1 85

CR.

ESTATE OF ALEX. PROULX.

1919.			
Feb. 8.	By Stock on ranch and boat	$	400 00

ESTATE OF JOHN McCRAW.

1918.			
Dec. 30.	By Cash found on deceased	$	54 30
1919.			
Jan. 25.	Wages		63 80
Feb. 26.	Bank		302 50

ESTATE OF GEO. D. ROSS.

1919.			
June 21.	By Wages	$	79 00
	Victory bond and interest		108 40

ESTATE OF EDWARD STEWART.

1919.			
April 16.	By Wages	$	29 35

ESTATE OF NEILS ANGUS SANDBERG.

1919.			
Oct. 18.	By Wages	$	89 75

ESTATE OF MASKUKI MIGAMOTO.

1919.			
Jan. 19.	By Life insurance	$1,000	00

ESTATE OF MALCOLM NEWBERG.

1919.			
	By Bank	$	210 19
	Cash on deceased		11 00
	Order of Eagles		10 00

ESTATE OF FREDERIC JOSS.

1919.			
Sept. 11.	By Refund of taxes	$	18 95

DR.

ESTATE OF THOS. HOLMES.

1919.			
June 6.	To O.A., commission	$	75

ESTATE OF JOHN WHEALSTROM.

1919.			
Nov. 3.	To Funeral expenses	$	18 00
Nov. 24.	O.A., commission		11 00

ESTATE OF TONY FORTMAN (OR FREEMAN).

1919.			
April 16.	To O.A., commission	$	4 00
June 24.	Taxes		12 15

ESTATE OF EMIL BRUNELL.

1919.			
June 12.	To Court costs, etc.	$	5 80
	Probate duty		13 31
Aug. 29.	Solicitor's fee		20 00
	Official Administrator		14 00
Sept. 6.	Funeral expenses		34 00
	St. Michael's Hospital		12 00
	Doctor's fees		6 00

ESTATE OF HARRY MCCLUSKEY.

1919.			
June 24.	To Taxes on land	$	9 98
June 27.	Fencing		46 25

ESTATE OF JOHN HIGGINS.

1919.			
May 8.	To Sister of deceased	$	200 32

ESTATE OF JANET TEFORD.

1919.			
Mar. 24.	To Sister of deceased	$	69 83
	" "		69 83
	Brother "		69 83
	" "		69 83
	Niece "		34 92
	Nephew "		34 92

ESTATE OF C. LEHTO.

1919.			
Feb. 25.	To Advertising	$	3 40
April 29.	Grave-plot		5 00

ESTATE OF PETER LECREN.

1919.			
April 29.	To Grave-plot	$	5 00
	J. Sutton, funeral expenses		10 00

ESTATE OF MAK LIN.

1919.			
Aug. 29.	To O.A., commission and trip to Chinatown	$	5 00
	Widow		35 50

ESTATE OF WM. STRICKLAND.

1919.			
Mar 4.	To O.A., commission	$	72 25
Aug. 13.	Trip to Sayward		25 00
Mar. 4.	Trip to Vancouver		15 00
	Solicitor's fees		37 75
	Advertising		15 40

ESTATE OF JOHN MIDDLEBROOK.

1919.			
Dec. 31.	To Commission and postage	$	80

1919. ESTATE OF RICHARD HOLM.

Mar. 20.	To Taxes on land	$	5 35
June 24.	" "		2 00

1919. ESTATE OF GEO. HILLARY.

June 25.	To Taxes paid	$	11 25

1919. ESTATE OF ALBERT E. GOODWIN.

Dec. 22.	To Court costs, advertising, etc.	$	5 52
	Express charges		1 30
	Solicitor's fees		27 00
	O.A., commission		16 70
	Mother of deceased		284 08

CR.

ESTATE OF THOS. HOLMES.

1919.			
May 12.	By sale of cabin	$	15 00

ESTATE OF JOHN WHEALSTROM.

1919.			
June 16.	By Wages	$	211 59

ESTATE OF TONY FORTMAN (OR FREEMAN).

1919.			
Mar. 26.	By Rent	$	28 90

ESTATE OF EMIL BRUNELL.

1919.			
June 23.	By Bank	$	163 04
June 12.	Government bond		100 00
	Interest		2 25

ESTATE OF HARRY MCCLUSKEY.

1919.			
June 10.	By Rent	$	44 00

ESTATE OF MAK LIN.

1919.			
Jan. 29.	By Wages	$	40 50

ESTATE OF WM. STRICKLAND.

1919.			
Feb. 28.	By Balance on sale of land	$	700 00

1919. ESTATE OF WM. MCCORMACK.

Dec. 31.	By Cash found on deceased	$	8 60
	Sale of gun		3 00

ESTATE OF JOHN MIDDLEBROOK.

1919.			
Dec. 31.	By Cash found on deceased	$	15 90

1919. ESTATE OF MICHAEL RUZICH.

Mar. 17.	By Frank Sohel, part payment on account	$	81 70

1919. ESTATE OF ALBERT E. GOODWIN.

July 27.	By Cash found on deceased	$	334 60

DR.

ESTATE OF WILLIAM HERBERT HATTON.

1919.			
Feb. 13.	To Wesley Willard	$	15 00
Aug. 23.	P. P. Harrison		23 65

ESTATE OF RICHARD WRAIGHT.

1919.			
Dec. 31.	To O.A., trip to camp	$	5 00
	Commission		1 60

ESTATE OF JOHN S. McBETH.

1919.			
Jan. 3.	To Commission and postage	$	4 00
April 29.	Grave-plot		5 00

ESTATE OF EDWARD FREEMAN.

1919.			
April 16.	To Bank exchange and commission	$	3 50

ESTATE OF PETER DOMINICK DOFFSOTTO.

1919.			
June 24.	To Government taxes on land	$	11 70
Sept. 12.	Fee for translation of legal papers		4 80
	Sister of the deceased		400 00

ESTATE OF JOSEPH GOODWAY.

1919.			
Jan. 1.	To Dr. R. G. Stevenson	$	25 00

ESTATE OF GIACOMO GIORDANA.

1919.			
Feb. 5.	To Vincent Riketta	$	14 00
	Frank Scanado		26 30
	S. Leiser & Co.		8 85
	Campbell Bros.		5 05
Feb. 25.	Advertising		3 60
Mar. 18.	Italian Consul		4 80
	Mother of deceased		197 14

ESTATE OF JOHN LARSEN.

1919.			
Nov. 3.	To Funeral expenses	$	18 00
Nov. 24.	O.A., commission		3 00

ESTATE OF LOUIS ASTLUND.

1919.			
Jan. 2.	To Death certificate	$	50
Feb. 7.	Court costs		5 30
Feb. 17.	Probate duty		6 16
April 16.	Solicitor's fees		20 00
	O.A., commission and postage		32 00
May 17.	P. P. Harrison		2 50

ESTATE OF BEN SENKLER.

1919.			
April 30.	To Court costs, etc.	$	5 50
	Probate duty		78
June 30.	Funeral expenses		17 00
Aug. 29.	Advertising		3 40
	Solicitor's fees		20 00
	Official Administrator		25 00

ESTATE OF EVERET NICMI.

1919.			
Sept. 23.	To Court costs	$	5 15
	Probate duty		42 95
Nov. 24.	Advertising		4 80
	Hospital fees		6 00
	Solicitor's fees		20 00
	O.A., commission, etc.		44 00
	Grave-digging		7 00
	Funeral expenses		10 00

ESTATE OF EMIL HILVONEN.

1919.			
Jan. 3.	To O.A., commission	$	81 00
	Solicitor's fees		20 00
Mar. 17.	Advertising		4 00
April 29.	Digging grave		7 00

CR.

ESTATE OF RICHARD WRAIGHT.

1919.			
Dec. 31.	By Wages	$	19 60

ESTATE OF G. F. ANDERSON.

1919.			
Dec. 31.	By Cash found on deceased	$	1 35

ESTATE OF JOHN S. McBETH.

1919.			
Jan. 19.	By Wages	$	69 25

ESTATE OF EDWARD FREEMAN.

1919.			
Mar. 4.	By Rent	$	8 00
April 9.	„		3 00

ESTATE OF JOHN LARSEN.

1919.			
June 17.	By Wages	$	57 12

ESTATE OF JOHN SUTHERLAND.

1919.			
Dec. 31.	By Cash found on deceased	$	2 80

ESTATE OF BEN SENKLER.

1919.			
Feb. 7.	By Cash found on deceased	$	1 04
Mar. 3.	Wages		14 71
May 21.	Cash, Pacific Building and Loan Association		482 48

ESTATE OF EVERET NICMI.

1919.			
Dec. 31.	By Bank	$	832 60
	Wages		32 73

DR.

ESTATE OF DAVID DEMERS.

1919.			
April 16.	To O.A., commission and postage	$	5 75
May 13.	Commission on sale of boat		10 50
	Funeral expenses		33 00

ESTATE OF TOUGAN SEMEN DAMZEFF.

1919.			
Dec.	To Funeral expenses	$	169 00
Mar. 20.	Court costs		7 30
	Probate duty		9 46
	Bank exchange		1 05
June 6.	Solicitor's fees		20 00
	Advertising		5 00
	O.A., commission and trip to Vancouver		58 00

ESTATE OF JOHN PEEP.

1919.			
Dec. 31.	To Funeral expenses	$	24 25
	O.A., commission		4 50

ESTATE OF ROBERT BELL.

1919.			
Dec. 31.	To Funeral expenses	$	24 00
	O.A., commission, postage, etc.		5 73

ESTATE OF ROBERT BANFIELD.

1919.			
Dec. 31.	To Funeral expenses	$	14 00
	Bank exchange		1 40

ESTATE OF JOHN W. GATEHOUSE.

1919.			
Oct. 1.	To John Urquhart, mortgage	$	500 00
	Geo. Hardy, commission		25 00
Nov. 24.	O.A., commission		35 00
	John Urquhart		40 00
	Father of deceased		200 00

CR.

ESTATE OF DAVID DEMERS.

1919.			
Jan. 2.	By Cash found on deceased	$	7 00
	Sale of boat		105 00

ESTATE OF TOUGAN SEMEN DAMZEFF.

1919.			
Nov. 29.	By Wages	$	42 55
Jan. 26.	Bank		904 99

ESTATE OF JOHN PEEP.

1919.			
Dec. 31.	By Cheque	$	84 88

ESTATE OF ROBERT BELL.

1919.			
Dec. 31.	By Cash on deceased	$	54 65

ESTATE OF ROBERT BANFIELD.

1919.			
Dec. 31.	By Cash on deceased	$	15 40
	Sale of personal effects		2 50

ESTATE OF JOHN W. GATEHOUSE.

1919.			
Oct. 10.	By Sale of property in Courtenay	$	800 00

WESLEY WILLARD.
Official Administrator.

ROSSLAND ELECTORAL DISTRICT.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF WILLIAM ANDERSON.

1919.			
Dec. 13.	To R. H. Townsend, commission	$	4 46

ESTATE OF DOMINIC BIANCHI.

1919.			
Dec. 12.	To C. F. Bianchi	$	928 60
Dec. 13.	Provincial Assessor, taxes		2 77
	Vic Laface		19 60
	F. Bandiara		30 00
	C. Negro		5 00
	A. S. Goodeve & Co.		14 00
	C. F. Pincott		128 31
	H. R. Townsend, commission		59 40

ESTATE OF JAMES ROBINSON CRANSTON.

1919.			
April 28.	To Provincial Assessor, Rossland	$	44 85

ESTATE OF GUNNER FRITJOF CARLSON.

1919.			
Dec. 13.	To J. Jordan	$	129 50
	C. F. Pincott		47 52
	Dr. Williams		35 00
	H. R. Townsend		11 24

CR.

ESTATE OF SAMUEL ALLEN.

1919.			
Sept. 17.	By Cash	$	2 25
Nov. 10.	"		1 50

ESTATE OF DOMINIC BIANCHI.

1919.			
Mar. 10.	By Cash	$	136 50
Nov. 10.	"		1,051 18

1919. ESTATE OF WM. H. BOGAN.

Sept. 17.	By Cash	$	1 75

ESTATE OF GUNNER FRITJOF CARLSON.

1919.			
May 12.	By Cash	$	142 06
Nov. 10.	"		82 70

DR.

ESTATE OF THOMAS P. COTTON.

1919.			
Aug. 15.	To L. A. Cotton	$	17 90
	R. H. Townsend, commission		95

ESTATE OF A. W. DEBOLT.

1919.			
Dec. 31.	To Cash	$	600 00

ESTATE OF ANTONIO DESANTIS.

1919.			
July 28.	To A. Cahiano	$	219 00
	Co-op. Italiano Association		60 40
	C. F. R. Pincott		92 73
	H. R. Townsend		42 82
	V. DeSantis		441 40

ESTATE OF CHARLES DUNDEE.

1919.			
Sept. 17.	To E. S. H. Winn	$	175 55

ESTATE OF W. GLENDENING.

1919.			
Dec. 15.	To H. R. Townsend	$	23 70

ESTATE OF K. A. HENNESSY.

1919.			
Sept. 17.	To R. J. Clegg	$	43 05
Dec. 15.	M. A. Henderson		12 00
	R. J. Clegg		10 00
	H. R. Townsend		9 25
	Hunter Bros.		25 90

ESTATE OF W. R. MELLARD.

1919.			
April 28.	To W. Carpenter	$	50 00
	J. H. Schofield & Co.		44 70
	Noble Binns		167 50
July 24.	Bank of Montreal		116 20
Aug. 15.	R. C. Crowl		137 98

ESTATE OF C. NYGARD.

1919.			
Mar. 10.	To C. F. R. Pincott	$	50 04
April 28.	J. M. Jordan		157 00
Dec. 16.	H. R. Townsend		26 70

ESTATE OF H. J. RICKARD.

1919.			
Dec. 17.	To H. R. Townsend	$	8 40

ESTATE OF LUKA SISICH.

1919.			
Dec. 30.	To E. Teizick	$	11 71
	C. F. R. Pincott		32 50
	H. R. Townsend		113 18

ESTATE OF JOHN SLOAN.

1919.			
April 26.	To J. Plester	$	3 00
	District Registrar		124 45
	R. Fox		2 00
Aug. 15.	J. Berg		1 00
	Sask. Guar. Co.		36 00
Oct. 15.	Attorney-General, Sask.		260 20
Dec. 17.	J. M. Jordan		198 00

ESTATE OF J. D. SWORD.

1919.			
Dec. 12.	To H. O. Alexander	$1,212	84
Dec. 17.	C. F. R. Pincott		31 95
	H. R. Townsend		102 08

ESTATE OF D. TANTALO.

1919.			
Dec. 17.	To H. R. Townsend	$	6 93

1919. ESTATE OF F. ULREHOW.

Dec. 17.	To H. R. Townsend	$	5 00

1919. ESTATE OF W. V. WYLDES.

Dec. 17.	To H. R. Townsend	$	3 95

1919. ESTATE OF H. ZADOR.

April 28.	To H. R. Townsend	$	3 05
	C. R. F. Pincott		12 65
	J. M. Jordan		45 00

CR.

ESTATE OF THOMAS P. COTTON.

1919.			
April 24.	By Cash	$	18 85

ESTATE OF A. W. DEBOLT.

1919.			
Dec. 31.	By Cash	$	600 00

ESTATE OF ANTONIO DESANTIS.

1919.			
May 12.	By Cash	$	856 35

ESTATE OF CHARLES DUNDEE.

1919.			
Sept. 17.	By Cash	$	250 00

ESTATE OF K. A. HENNESSY.

1919.			
July 21.	By Cash	$	105 00
Sept. 17.	"		80 00

ESTATE OF W. R. MELLARD.

1919.			
Mar. 10.	By Cash	$1,125	04
April 14.	"		19 40
July 21.	"		45 50
Sept. 17.	"		18 00
Dec. 5.	"		13 75

ESTATE OF C. NYGARD.

1919.			
Mar. 10.	By Cash	$	533 89

ESTATE OF LUKA SISICH.

1919.			
April 12.	By Cash	$	68 85
July 21.	"		2,194 64

ESTATE OF JOHN SLOAN.

1919.			
Mar. 10.	By Cash	$	40 15
April 14.	"		386 73
May 12.	"		200 00
July 21.	"		11 00

ESTATE OF J. D. SWORD.

1919.			
Mar. 10.	By Cash	$	42 59
April 14.	"		567 53
July 21.	"		72 13
Aug. 15.	"		587 35

ESTATE OF D. TANTALO.

1919.			
April 14.	By Cash	$	1 48

1919. ESTATE OF H. ZADOR.

April 14.	By Cash	$	60 70

H. R. TOWNSEND,
Official Administrator.

ATLIN MINING DIVISION.

RETURN OF MONEYS received and paid on Account of Intestate Estates for the Year ending December 31st, 1919, as required by Section 46 of the "Administration Act," "Revised Statutes of British Columbia, 1911."

DR.

ESTATE OF LOUIS C. CLARK.

1919.			
Aug. 26.	To J. A. Fraser, Gold Commissioner, for advances re-recording certain placer claims	$	35 00

ESTATE OF FRED. W. MARKUS.

1919.			
Jan. 24.	To J. A. Fraser, Gold Commissioner, refunding payment to J. Dunham	$	5 00
	Gold Commissioner, refunding payment to King's Printer		7 00
	Gold Commissioner, refunding payment for rerecording "Eureka" and "Mountain Hill" Groups		35 00
Mar. 11.	"Empire" Publishing Co.		7 00
Aug. 26.	Gold Commissioner, refund, F.M.C.		5 00
Oct. 21.	Gold Commissioner, refunding advances for recording certificate of improvements and Crown-grant fees, "Chakawana" Mineral claim		27 50

ESTATE OF NILS OTTO NELSON.

(Under "Placer-mining Act.")

1919.			
April 1.	To Remitted to Treasury	$	90 20
	R. A. Roxborough		20 25
	Gold Commissioner		15 10

ESTATE OF THADEE OBALSKI.

1919.			
Jan. 24.	To Remitted for deposit to credit of estate	$	30 00
	J. A. Fraser, refunding advances for $1.50 and $1.30		2 80
Aug. 26.	Refunding advance, payment taxes		7 55

ESTATE OF AXEL SWANSON.

1919.			
Oct. 16.	To Gold Commissioner, refunding advance, payment F.M.C.	$	5 00

CR.

ESTATE OF LOUIS C. CLARK.

1919.			
Dec. 31.	By Balance	$	448 95

ESTATE OF FRED. W. MARKUS.

1919.			
Dec. 31.	By Balance	$	203 51

ESTATE OF NILS OTTO NELSON.

1919.			
Dec. 31.	By Balance	$	54 85

ESTATE OF THADEE OBALSKI.

1919.			
Dec. 31.	By Balance	$	468 33

ESTATE OF AXEL SWANSON.

1919.			
Dec. 31.	By Balance	$	623 90

J. A. FRASER,
Official Administrator.

WEST SUMMERLAND, B.C., December 2nd, 1919.

Auditor-General, Victoria, B.C.,

RE INTESTATE ESTATES.

SIR,—In reply to your request for report of balance in hands of the Provincial Treasurer in estates in my hands, I submit following:—

Wm. George Raby Estate, $49.55 net; George Raby Estate, $129.04 net; Teiji Sato Estate, $252.20 net; Ralph Bernal Crawley, *nil.*

In the case of Teiji Sato Estate I have sent in a requisition in favour of the Summerland supply Co., Ltd., for $67.50, but do not know that this estate has been debited for this sum by the Provincial Treasurer.

The above is the total number of estates in my hands at this date. In the Crawley Estate I have to asssume the requisitions issued by me some months ago have been satisfied by the Provincial Treasurer, as I have no definite information on this point. However, I issued requisitions that would close out the balance of funds in this estate in the Provincial Treasurer's hands from myself.

Yours truly,
W. C. KELLEY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

NINTH ANNUAL REPORT

OF THE

SUPERINTENDENT OF INSURANCE

FOR THE

PROVINCE OF BRITISH COLUMBIA

1920

(BUSINESS TRANSACTED IN 1919)

PRINTED BY
AUTHORITY OF THE LEGISLATIVE ASSEMBLY.

VICTORIA, B.C.:
Printed by WILLIAM H. CULLIN, Printer to the King's Most Excellent Majesty.
1920.

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned has the honour to present the Ninth Annual Report of the Superintendent of Insurance for the year ended December 31st, 1919.

J. W. DE B. FARRIS,

Attorney-General.

Victoria, B.C., October 11th, 1920.

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REPORT OF THE SUPERINTENDENT OF INSURANCE.

DEPARTMENT OF INSURANCE,
VICTORIA, B.C., October 11th, 1920.

The Honourable J. W. de B. Farris,
Attorney-General, Victoria, B.C.

SIR,—The Ninth Annual Report of the Department, covering the year ended December 31st, 1919, is herewith submitted in accordance with the "British Columbia Fire Insurance Act" and the "Insurance Act."

I. "BRITISH COLUMBIA FIRE INSURANCE ACT."

(1.) FIRE INSURANCE COMPANIES.

At the end of 1919, 118 companies held licences for the business of fire insurance, an increase of nine during the year. All are also licensed by the Dominion. It will be seen by the list printed on page 25 that four were restricted to the insurance of automobiles. The origin of the different companies is as follows:—

Dominion of Canada	25
Provinces of Canada	5
Great Britain	33
Australia	1
Hong Kong	4
United States	46
France	4
Total	118

The list shows increases of four Canadian companies, one from Great Britain, two from Hong Kong, and two American companies, as compared with 1918.

Ten companies obtained licences during 1919, namely:—

American Equitable Assurance Company of New York, United States.
China Fire Insurance Company, Limited, Hong Kong.
Girard Fire & Marine Insurance Company, United States.
Scottish Metropolitan Assurance Company, Limited, Great Britain.
United States Fire Insurance Company, United States.
Canadian Surety Company, Canada.
General Accident Assurance Company of Canada, Canada.
Guardian Insurance Company of Canada, Canada.
London & Lancashire Guarantee & Accident Company of Canada, Canada.
Yang-tsze Insurance Association, Limited, Hong Kong.

The last five having been prior to 1919 licensed under the "Insurance Act."

The Rhode Island Insurance Company withdrew from the Province.

The figures for premiums and losses of the year will be found on pages 29 and 30, Table I. The total premiums record an increase, while the losses are a trifle less than in 1918, and the business of the year was quite profitable. Other statistics are shown in Tables II., III., and IV. It will be observed that this Province again took a high place among the different Provinces of the Dominion in respect of the ratio of losses. Table IV., however, is perhaps a fallacious criterion of losses, as the premiums paid may, for instance, be higher in British Columbia than they are in Ontario, while the values insured and destroyed may be the same.

(2.) FIRES.

The statistics concerning the fires which occurred during 1919 are set forth in detail in Tables V. to IX., pages 31 to 39. The losses are again large—too large when the value of property destroyed *per capita* of the population of the Province is borne in mind. It cannot be urged too vehemently that more carefulness, closer inspection, and better equipment, kept constantly in order, are needed in order to reduce these losses and save to the community their excessive annual cost.

The work of the Department in the field of advice, inspection, and inquiry has been actively prosecuted by my able and enthusiastic officer, Mr. J. A. Thomas. He has met with rebuffs and disappointments, but it becomes clearer every day that the great silent public has been impressed by and is attentively watching his labours. The effect will be observed in those quarters which are responsible for providing proper protection and safeguards to the lives and property of their fellow-citizens. In work of this character one cannot look for speedy results. It is a case of education by degrees, which must filter through public opinion until it grows into a habit, so that an individual will as naturally take precaution against fire as he will in crossing a street against being run down by a motor.

Mr. Thomas has visited nearly all the important towns of the Province and carried out systematic inspections. In order to indicate the work that lies before us to improve the present state of affairs, I quote some extracts from his report to me:—

"From the standpoint of fire-prevention, the conditions I have found are exceedingly grave. A number of cities have good fire-prevention by-laws, but in no case are they properly enforced by the local authorities. The recommendations of fire chiefs and building inspectors are being ignored, and conditions are allowed to exist that are a menace to the whole community. A result of this is seen in the high rates charged for insurance. I have found a universal demand for a lower rate of insurance, but in almost every case I have been compelled to point out that under existing conditions it cannot be expected that the rates will be reduced. . . .

"The fundamental principle of fire-prevention is good housekeeping. The conditions in this regard are simply criminal. Business blocks, apartment-houses, and industrial plants were found with basements and back rooms filled with inflammable trash of all kinds, waiting for a spark to ignite it. Dray-loads of ashes, the accumulation of years, were found on wood floors and in boxes and barrels. Metal stove-pipes through wood partitions and floors are common. There is hardly any regular system of inspection by the authorities. In addition to the above hazards, we have in many of our cities a number of deserted buildings on lanes and streets. As a rule these 'conflagration-breeders' are full of inflammable trash and are open to tramps and children. They are a constant menace to surrounding property and add greatly to the cost of insurance. In the industrial plants throughout the Province the same conditions obtain. In plants representing a capital of hundreds of thousands of dollars we find rotten hose on the stand-pipes, stand-pipes blocked with lumber or debris, fire-extinguishers empty, and generally dirty housekeeping conditions. . . .

"One of the outstanding fire hazards in connection with our sawmills is the refuse-burner. These burners are a great source of trouble and have undoubtedly been the source of a number of destructive fires. . . .

"Another serious hazard is the public garage. Owing to the development in the automobile business these have sprung up all over the Province. As a result we have old and unsuitable buildings, with oil-soaked floors, open stairways and elevator-shafts in the midst of a range of wooden buildings, both in the residence and business sections. The storage of gasolene and oils in the smaller towns and municipalities is not properly controlled. . . .

"The extensive use of electricity for light, heat, and power throughout the country has brought to the front the question of electrical hazards. In many buildings the hazard due to defective wiring on both inside and outside work is a serious one. The most serious cases found by this Department have been reported on by the Inspector of Electrical Energy. The recommendations of the Inspector have in every case been placed in the hands of the proper civic authorities, but have not in all cases been carried out. . . .

"In a number of towns the water system is inadequate to cope with a serious fire, and in many places plans of the systems are not available; the only knowledge as to the locations of valves and intakes is under the hat of some one man. . . ."

It can easily be realized that unless the matter of fire-prevention is taken seriously in hand not only by the municipal authorities, but also by the general public, high losses and high insurance rates will continue.

It must be admitted that often where there is a desire on the part of municipalities to do what they should, great difficulty is experienced. Even to obtain expert advice is costly, and fire-protection is a technical subject, involving as it does such questions as water-supply and adequate modern equipment. This fact has impressed me on several occasions after Mr. Thomas has visited some small town. It is not properly his business to act as, or the duty of the

Government to furnish, an expert; but it has occurred to me that possibly some method might be devised by which a public body could secure technical advice at a reasonable fee. So far as his time, fully occupied as it is, permitted, Mr. Thomas's services were placed at the disposal of the municipalities, schools, and hospitals, and in many instances were welcomed.

The Dominion Government last year proclaimed October 9th as "Fire-prevention Day" in emulation of the course adopted in the United States, and through its Fire Commissioner, Mr. J. Grove-Smith, endeavoured to interest public bodies throughout the country. Our Department gave every assistance in its power, and steps were taken to emphasize the importance of the occasion by communicating with Mayors, editors, school authorities, Boards of Trade, and others. There is here, I think, a good field for advancing the cause of fire-prevention.

Dealing in detail with the figures contained in Tables V. to VIII., it is satisfactory to note that the loss from fires reported to the Department is smaller, but the number of fires considerably greater, the larger cities mainly accounting for the increase. Fires involving a loss of more than $30,000 occurred as follows:—

1919—

January: Vancouver; warehouse; cause, ashes against wood	$ 82,832
March: Vancouver; metal-works; cause unknown	56,849
September: Mission District; dwelling; cause, spark from locomotive	30,000
September: Point Grey; hospital; cause unknown	30,000
September: Vancouver-New Westminster District; sawmill; cause, sparks from boiler	55,000
October: Vancouver; lumber-mill; cause unknown	246,235
November: West Kootenay; mining property; cause unknown	39,954
December: Victoria; sawmill; cause, hot bearing	40,989
Total	$581,859

It will be observed that these eight fires alone are responsible for more than 25 per cent. of the total loss. There cannot be too much inspection or too many precautions in the case of industrial premises and buildings of a public character. We can only be thankful in the present state of fire-protection, and with the habits of the people as they are, when a year passes without some kind of conflagration. The increase in the number of fires appears principally under the headings of dwellings, hotels, laundries, and stores. A superficial analysis of the causes in the first class alone indicates how many fires could be prevented, being due either to gross negligence or to structural defects. The proportion of fires for which a cause could not be assigned shows a decrease.

A great amount of investigation was carried on by Mr. Thomas and in several cases formal inquiries were held under the provisions of the amendments of 1918. The valuable effect of holding an inquiry or making a close investigation into a fire is becoming recognized. A desirable measure of publicity attaches to it, and important results often follow. In three cases the fire was demonstrated to be of an incendiary origin.

II. "INSURANCE ACT."

At the close of 1919, 130 companies held licences under this Act to transact various classes of insurance. The data will be found on pages 27 and 28. A summary is here set out:—

Where Incorporated.	Dominion Licensees.	Provincial Licensees.	Total.
British Columbia	...	2	2
Canada	37	...	37
Other Provinces of Canada	3	2	5
Great Britain	24	10	34
Australia	1	...	1
New Zealand	...	1	1
Hong Kong	2	2	4
Japan	...	1	1
United States	43	2	45
Totals	110	20	130

The new companies licensed numbered twenty-three, namely:—

Aetna Life Insurance Company, United States.
American Alliance Insurance Company, United States.
Alliance Insurance Company of Philadelphia, United States.
Canadian Fire Insurance Company, Canada.
Continental Insurance Company, United States.
Fidelity-Phenix Fire Insurance Company, United States.
Firemen's Insurance Company of Newark, N.J., United States.
General Accident Fire & Life Assurance Corporation, Limited, Great Britain.
Glens Falls Insurance Company, United States.
Globe & Rutgers Fire Insurance Company, United States.
Hartford Fire Insurance Company, United States.
Liverpool-Manitoba Assurance Company, Canada.
National Benefit Assurance Company, Limited, Great Britain.
Newark Fire Insurance Company, United States.
New Zealand Insurance Company, Limited, New Zealand.
Northern Assurance Company, Limited, Great Britain.
Northwestern Mutual Fire Association, United States.
Occidental Fire Insurance Company, Canada.
Scottish Metropolitan Assurance Company, Limited, Great Britain.
United States Fire Insurance Company, United States.
United States Lloyds, Inc., United States.
Western Casualty Company, United States.
Westchester Fire Insurance Company, United States.

Of these, seventeen had previously been licensed under the "Fire Insurance Act," and their object was to secure authority to write automobile or marine insurance or insurance against civil commotion. The demand for the last kind of protection was quite temporary and arose at the time when strikes were prevalent last year. It is evident from the premiums received, as shown by Table XIII., page 43, that a considerable volume of business was done. All the new licensees held licences under the Federal "Insurance Act," except the New Zealand Insurance Company and the United States Lloyds, Inc.

The Gresham Life Assurance Society, Limited, withdrew from the Province during 1919.

During the year under review the Canada Accident Assurance Company changed its name to "The Canada Accident and Fire Assurance Company," and the London & Lancashire Life & General Assurance Association, Limited, took the new name of "London and Scottish Assurance Corporation, Limited."

Four companies were issued supplementary licences, as follows:—

Aetna Insurance Company (tornado and inland transportation).
The Canada Accident and Fire Assurance Company (burglary and automobile).
Great American Insurance Company (explosion, including riot and civil commotion).
London Assurance Corporation (automobile).

The general statements of companies holding no Federal licence appear on pages 11 to 23.

A large amount of new life insurance was again written, and the publicity which the business has received, directly and indirectly, during the past few years is bearing fruit. The companies have been energetic in pressing home the manifold advantages of their various policies, and improved salesmanship on the part of the agents has contributed. Other factors have played an important part. The epidemic of influenza, the depreciated value of existing life insurance due to the general rise in prices, the increased death duties, and high wages may be mentioned as principal causes why life insurance has so grown in popularity. It is to be hoped that there will be no aftermath of numerous lapsed policies. The statistics are given in Tables XI. and XII., pages 41 and 42.

Life insurance has been regarded as a stable form of insurance, almost incapable of much further development. But two kinds, novel in their application, have been much in evidence. The one is "group insurance," which is now being written subject to certain conditions by companies licensed in Canada. The definition laid down by the Insurance Commissioners of the United States is as follows:—

"Group life insurance is that form of life insurance covering not less than fifty employees, with or without medical examination, written under a policy issued to the employer, the premium on which is to be paid by the employer or by the employer and employees jointly, and insuring only all of his employees, or all of any class or classes thereof determined by conditions pertaining to the employment, for amounts of insurance based upon some plan which will preclude individual selection, for the benefit of persons other than the employer; provided, however, that when the premium is to be paid by the employer and employee jointly and the benefits of the policy are offered to all eligible employees, not less than 75 per cent. of such employees may be so insured."

It is still in an experimental stage and it is difficult to say whether it will survive or not. It may prove too costly for the companies or the employers, or it may not yield the employer the results he anticipates. I believe that proper precautions have been taken, so that, should loss ensue, it will not fall on the shoulders of the general policyholder.

The other form is a policy which pays not only a principal sum, but also regular sums in the case of permanent disability. These contracts differ in their terms, but the new feature seems to lead logically to a combined policy including insurance against sickness and accident, as well as life insurance. Under proper safeguards the evolution of life insurance in this way is quite reasonable.

Owing to the effect of losses incurred through deaths from influenza some companies did not deem it wise to pay "dividends" or "bonuses," or paid a smaller dividend than usual. While the policyholders were disappointed, the course adopted is manifestly prudent, and the companies will be all the stronger to meet any new emergency.

The figures for premiums and losses in the miscellaneous fields of insurance are printed in Tables XIII. and XIV., pages 43 and 44, and indicate a considerable growth of business. The total percentage of losses is, however, heavier.

An increase in the volume of accident and health insurance has taken place, and will continue if the form of policy is developed along natural lines. There is a tendency towards uniformity in rates and conditions, and a contract simple and intelligible in its terms and giving general protection, to the exclusion of merely attractive "benefits." The payment of the premiums monthly will, it is hoped, disappear. Its expense, owing to the work entailed, can only add to the cost of the insurance.

Automobile insurance has made a further big stride and was second only to marine insurance in the amount of premiums collected. It may be said to be still in a tentative stage, and the policies and rates have varied considerably. One may anticipate that a settled basis for rates and a more or less uniform type of policy, furnishing coverage against all the risks incident to the ownership and operation of an automobile, will soon be evolved. The general public is vitally interested in this form of insurance owing to the ever-growing list of accidents. The liability for damages may be very large and adequate insurance should be carried. It is evident that, while a policy protects the car-owner or other person liable, it also secures compensation for injuries inflicted. The time may come when every owner of an automobile will have to carry a policy in the same way as he has to hold a licence.

III. LEGISLATION.

Although it does not strictly fall within the purview of this report, I feel it desirable to add the amendments to the "Life-insurance Policies Act" passed by the Legislature this year. The new provisions legalize insurance by and on the lives of minors, with certain restrictions, and are similar in substance to legislation existing in other Provinces.

There exists a certain demand for an Act requiring insurance agents to hold a licence. The insurance laws of Alberta, Manitoba, Ontario, Quebec, and Saskatchewan already contain provisions of this character, and I am informed that they have proved highly beneficial in their operation not only to the public, but also to the insurance fraternity. The business of insurance—life, fire, or any other—grows more technical each year and demands knowledge as well as good personal qualifications. In fact, the business is becoming a profession, and as such an agent should be educated in its principles and practice, like a lawyer or a doctor has to be, and the public is entitled to be safeguarded against the incompetent or dishonest agent.

Agents for fire insurance have been much discussed since the Masten Commission and Report, owing to the high commissions which it is alleged they receive and the peculiar and paradoxical

position they occupy. While they could and should do a great deal to prevent fires occurring, any step taken to that end is directly opposed to their own interests—their incomes are in direct proportion to the premiums they can secure. It must be remembered that it is only within recent times that fire insurance companies have felt it incumbent on them to co-operate in measures designed to reduce fire-waste. Their view was that their contract was merely with the individual insured and did not affect the community. To-day they are classed among public services or utilities and regarded as owing a duty to the public. The agents have not yet come to be looked upon in the same light. It is obvious, however, that that day cannot be far distant.

I owe an apology for the delay in submitting this report, but owing to my absence on leave and the office staff being very fully occupied, it has not been possible to produce it earlier.

I have the honour to be,

Sir,

Your obedient servant,

H. G. GARRETT,

Superintendent of Insurance.

APPENDIX.

INSURANCE OTHER THAN FIRE INSURANCE.

Annual Statements of Provincial Licensees for the Year ended December 31st, 1919.

BRITISH COLUMBIA PLATE GLASS INSURANCE COMPANY.

Head Office—Vancouver, B.C.

Directors.

Walter E. Graveley. A. G. Thynne.
A. F. Beasley. H. W. Chamberlin.
F. M. Chaldecott.

Alfred Farmer, Secretary.

Amount deposited with the Government of British Columbia: British Columbia Inscribed Stock, £200; Township of Richmond bonds, $5,000; Dominion of Canada War Loan bonds, $1,000; total (par), $6,972.22.

Authorized capital	$25,000 00
Amount subscribed	9,600 00
Amount paid up	3,840 00

Statement for the Year ended December 31st, 1919.

Assets.

Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	$15,138 18
Cash on deposit to the Company's credit and not drawn against on December 31st, 1919	2,503 34
Premiums uncollected (net commissions deducted)	3,309 93
Interest due or accrued and unpaid	83 73
Total assets	$21,035 18

Liabilities.

Total reserve of unearned premiums, $20,110.99; carried out at 80 per cent. thereof	$16,088 79
Total amount of liabilities	$16,088 79
Capital stock paid up	3,840 00
Total of liabilities and paid-up capital	$19,928 79
Excess of assets over such total	$ 1,106 39

Receipts.

Net cash received for premiums	$17,968 56
Cash received for interest	759 80
Cash received for debentures, mortgages, etc. (not extended), $1,061.50.	
Cash from all other sources	659 42
Total receipts	$19,387 78

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 6,288 99
„ for statutory assessment and licence fees	251 67
„ „ rent and taxes	118 70
„ „ salaries, directors' and auditors' fees	510 00
„ „ printing, stationery, and advertising	22 00
„ „ postage, telegrams, and express	15 00
„ „ other expenses	27 75
Total expenses of management	$ 7,234 11
Amount paid for losses occurring during the year	8,302 25
Cash paid for dividends	960 00
Cash paid for debentures, mortgages, etc. (not extended), $2,000.	
Total expenditures	$16,496 36

LIST OF SHAREHOLDERS.

Name.	Residence.	No. of Shares.	Amount subscribed.	Amount paid,
H. Bell-Irving	Vancouver	5	$ 500	$ 200
W. E. Graveley	„	5	500	200
A. McC. Creery	„	1	100	40
A. F. Beasley	Victoria	7	700	280
T. O. Richards	Vancouver	1	100	40
H. W. Chamberlin	„	5	500	200
H. C. Ackroyd	„	1	100	40
D. B. Charleson	„	1	100	40
W. J. Albutt	„	17	1,700	680
R. Martin	„	1	100	40
J. Rogers	„	2	200	80
A. G. Thynne	„	35	3,500	1,400
F. M. Chaldecott	„	5	500	200
C. E. Hope	„	2	200	80
T. A. Blythe (estate of)	„	3	300	120
P. W. Charleson	„	5	500	200
		96	$9,600	$3,840

CANTON INSURANCE OFFICE, LIMITED.

Head Office—Victoria, Hong Kong.

Consulting Committee.

The Hon. Mr. John Johnstone, Chairman.
G. W. Barton.
The Hon. Sir Paul Chater, C.M.G.
C. S. Gubbay.
Sir Robert Ho Tung.
F. Maitland.
T. E. Pearce.
A. H. Compton.

General Agents.

Messrs. Jardine, Matheson & Co., Limited, Hong Kong.

Capital authorized and subscribed	$2,500,000 00
Amount paid up	1,000,000 00

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets.

Cash in hand, in transit, and on current account and fixed deposits with banks		$1,273,194 69
Gold investments—		
British, Indian, and Colonial Government bonds and stocks		2,595,927 93
Foreign Government loans		340,971 56
British, Colonial, and Foreign railway and port trust bonds and stocks		156,058 87
Silver investments—		
Hong Kong Government 6% War Loan of 1916		100,000 00
Mortgages, loans, and debentures		1,678,812 56
Other investments		407,241 02
Agency balances		302,166 70
Accounts receivable		157,098 47
Total assets		$7,011,471 80

Liabilities.

Capital, 10,000 shares of $250 each = $2,500,000, of which $100 per share has been paid up		$1,000,000 00
Reserve Fund		801,282 05
Reinsurance Fund		1,176,228 27
Investment and Exchange Fluctuation Account		443,056 99
Underwriting Suspense Account		313,280 00
Uncollected dividends		29,666 00
Accounts payable		136,019 09
Working Account, 1918	$1,476,175 88	
Less interim dividend at $18 per share paid on May 21st, 1919	180,000 00	
		1,296,175 88
Working Account, 1919		1,815,763 52
Total liabilities		$7,011,471 80

NOTE.—Dollars in Hong Kong currency, with sterling exchange at 4s. 10½d.

THE GREAT NORTH INSURANCE COMPANY.

Head Office—Calgary, Alberta.

Directors.

W. J. Walker, President.
Col. the Hon. A. C. Rutherford, K.C., B.A., LL.D., B.C.L.
Hon. P. E. Lessard.
Lieut. F. A. Walker.
Edward J. Fream.
J. K. McInnis.
Geo. H. Ross, K.C., LL.B.
J. T. North, Secretary.

Amount deposited with the Government of British Columbia: $5,000 in cash.

Authorized capital	$500,000 00
Amount subscribed	221,200 00
Amount paid up in cash	103,443 51

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets.

Cash value of mortgages, exclusive of interest	$ 18,000 00
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	37,181 17
Cash on hand at Head Office	5,614 95
Cash on deposit to the Company's credit and not drawn against on December 31st, 1919	9,672 25
Agents' balances and premiums uncollected	14,314 59
Bills receivable	33,453 10
Premium notes in course of collection	12,435 76
Calls on capital stock outstanding in course of collection	18,666 49
Reinsurance collectable on unpaid and unadjusted losses	7,522 88
Due from other companies for reinsurance on losses already paid	9,316 20
Amount of all other assets	386 08
Office furniture, etc. (not extended), $4,684.	
Total assets	$166,563 47

Liabilities.

Claims or losses adjusted	$ 6,275 74
Claims or losses resisted	3,852 00
Claims or losses in suspense, or supposed, or reported	10,675 00
Total amount of losses or claims unpaid	$ 20,802 74
Live-stock reserve, 50 per cent. of premiums in force	11,012 00
Amount of unpaid loans	5,100 00
Amount borrowed on security of any of its legally pledgable assets	20,000 00
Total reserve of unearned premiums for all outstanding risks	31,171 60
Amount of all other liabilities	20,985 66
Total amount of liabilities	$109,072 00
Capital stock paid up in cash	103,443 51
Total of liabilities and paid-up capital	$212,515 51
Excess of assets over such total	$ 45,952 04

Receipts.

Net cash received for premiums	$182,915 78
Cash received for interest	3,877 61
Cash received for calls on capital stock	12,356 50
Total receipts	$199,149 89

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 45,429 95
„ for law costs	140 06
„ „ fuel and light	38 75
„ „ investigation and adjustment of claims	1,956 49
„ „ interest, discount, and exchange	223 24
„ „ statutory assessment and licence fees	3,539 25
„ „ travelling expenses	8,575 03
„ „ rent and taxes	993 12
„ „ salaries, directors' and auditors' fees	24,115 25
„ „ printing, stationery, and advertising	3,983 69
„ „ postage, telegrams, and express	1,587 05
„ „ other expenses	5,805 01
Total expenses of management	$ 96,386 89
Net amount paid for losses occurring prior to 1919	5,510 71
Net amount paid for losses occurring during 1919	173,234 41
Cash paid for dividends	1,399 41
Total expenditure	$276,531 42

Returns for British Columbia.

Deposit with Government, cash	$ 5,000 00
Other assets	112 00
Liabilities	468 25
Premiums written, less return premiums	936 50
Losses incurred, net	.....
Losses paid, net	.....
Net amount at risk	10,425 00

LONDON & PROVINCIAL MARINE & GENERAL INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Edwin Gray, Chairman.
James W. Arbuthnot.
James Hamilton.
Richard De Neufville.
Herbert E. Secretan.
William M. Strachan.

Irving G. Cortazzi, Secretary.

Statement for the Year ended December 31st, 1919.

Assets.

	£	s.	d.
By Investments valued at December 31st, 1919	1,303,344	6	2
Interest accrued	11,462	1	2
Cash on deposit and at bankers	56,619	15	0
Outstanding accounts due at home and abroad	81,866	19	8
Policy stamps	406	17	11
Total assets	£1,453,699	19	11

Liabilities.

	£	s.	d.
To Authorized capital, 100,000 shares of £10 each = $1,000,000.			
Paid-up capital, 100,000 shares of £10, £1 paid	100,000	0	0
Reserve Fund	200,000	0	0
Sundry creditors	98,093	17	10
Investment reserve	25,000	0	0
Underwriting Suspense Account to meet all claims and other liabilities on 1918 and previous years	415,844	5	4
Balance of Underwriting Account, 1919	432,800	0	7
Balance of Profit and Loss Account	181,961	16	2
Total liabilities	£1,453,699	19	11

MARITIME INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

Edward Hatton Cookson, Chairman. James Allan Cook.
Johan Frederick Caroe. Harold Sumner.
William C. Aikman. Jasper Muirhead Wood.
John Crosby Nicholson, Secretary.

Authorized capital	£1,000,000
Amount subscribed	500,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets.

	£	s.	d.
By Investments	1,340,458	16	9
Sundry debtors	131,075	10	4
Interest and dividends accrued, but not payable until after December 31st, 1919	5,696	10	8
Cash on deposit, in hand, and on current account	69,796	5	10
Total assets	£1,547,027	3	7

Liabilities.

	£	s.	d.
To Shareholders' capital paid up	100,000	0	0
General Reserve Fund	200,000	0	0
Underwriting Fund	699,518	7	8
Profit and Loss Account	196,249	1	6
	£1,195,767	9	2
Sundry creditors	351,259	14	5
Total liabilities	£1,547,027	3	7

NATIONAL PLATE GLASS INSURANCE COMPANY.

Head Office—Winnipeg, Man.

Amount deposited with the Government of British Columbia: City of Salmon Arm bonds, $5,000; City of Nelson bonds, $300; City of Alberni bonds, $210; total (par), $5,510.

Authorized capital	$30,000 00
Amount subscribed	15,000 00
Amount paid up	10,200 00

THE OCEAN MARINE INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Hon. Charles Napier Lawrence, Chairman.
Sir Alex Drake Kleinwort, Bt.
Herbert Robinson Arbuthnot.
Harry Cunningham Brodie.
James Blyth Currie.
Phillip Moritz Deneke.
Maurice Ruffer.
Philip Secretan.
David Nairn Shaw.

H. T. Russell Ross, Secretary.

Capital authorized and subscribed £1,000,000
Amount paid up 100,000

Statement for the Year ended December 31st, 1919.

Assets.

	£	s.	d.
British Government securities	475,169	2	6
Public Boards, United Kingdom	27,725	0	0
Municipal and county securities, United Kingdom	17,937	10	0
Indian and Colonial Government securities	71,602	10	0
Foreign Government securities	166,577	1	5
Colonial municipal securities	22,125	0	0
Foreign municipal securities	80,583	8	3
Guaranteed and other Indian railway stock	31,645	0	0
Indian Government railway annuities	11,375	0	0
Railway and other debentures, home and foreign	153,417	4	4
Railway preference and guaranteed stocks	9,029	0	10
Railway and ordinary stocks	21,718	16	0
Loans on stocks and shares	227,812	10	0
	£1,316,717	3	4
Freehold premises	125,000	0	0
	£1,441,717	3	4
Agents' balances	138,598	11	9
Outstanding premiums, etc.	103,589	5	9
Bills receivable	606	6	0
Interest accrued but not yet payable	11,819	17	4
Policy stamps on hand	231	14	0
Cash—			
On deposit	160,991	5	0
In hand and on current account	6,252	4	6
Total assets	£1,863,806	7	8

Liabilities.

	£	s.	d.
Capital, 40,000 shares of £25, paid up £2 10s. per share (now vested in the North British and Mercantile Insurance Company)	100,000	0	0
Marine Fund—			
Reserve £500,000 0 0			
Profit and loss 304,701 4 1			
	804,701	4	1
Underwriting reserve	139,210	4	6
Balance of Underwriting Account, 1919	397,235	15	5
Sundry creditors	422,659	3	8
Total liabilities	£1,863,806	7	8

THE RELIANCE MARINE INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

Gilbert W. Fox, Chairman.
J. U. Hodgson.
George Atherton.
Lieut.-Col. F. R. S. Balfour.
Oswald Dobell.
The Hon. Evelyn Hubbard.
R. A. Love.
J. J. Ritchie.
R. W. Sharples.

F. R. Edwards, Secretary.

Authorized capital	£500,000
Amount subscribed	500,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets.

	£	s.	d.
By Investments at market value £524,566 4 1			
Less loans on war stock 30,000 0 0			
	494,566	4	1
Policy stamps	134	12	11
Cash at bankers and in hand	37,121	3	1
Interest accrued but not received	4,091	6	7
Accounts due to the Company for premiums, salvages, etc.	135,356	11	5
Total assets	£671,269	18	1

Liabilities.

	£	s.	d.
To Capital, 50,000 shares at £10 per share, £500,000; paid up, £2 per share	100,000	0	0
Reserve Fund	200,000	0	0
Balance of Profit and Loss Account £63,218 16 6			
Less interim dividend paid July 1st, 1919 ..... 10,500 0 0			
	52,718	16	6
Balance of Marine Account, 1919	134,501	16	3
Fire Insurance Fund	55,458	5	10
Suspense and Special Reinsurance Accounts	49,868	12	5
Accounts due by the Company	78,699	15	4
Dividends unpaid	22	11	9
Total liabilities	£671,269	18	1

ROYAL PLATE GLASS INSURANCE COMPANY OF CANADA.

Head Office—Vancouver, B.C.

Directors.

Dr. D. H. Wilson. R. W. Harris.
J. P. Nicolls. A. P. Bogardus.
W. H. Malkin.

C. A. Wickens, Secretary-Treasurer.

Amount deposited with the Government of British Columbia: Deposit receipt of Canadian Bank of Commerce, $125; Dominion War Loan bonds (par), $5,000; total, $5,125.

Authorized capital	$25,000
Amount subscribed	10,000
Amount paid up	2,750

Statement for the Year ended December 31st, 1919.

Assets.

Cash value of mortgages, exclusive of interest	$ 2,250 00
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	7,000 00
Cash deposited with Government	125 00
Cash on deposit to the Company's credit and not drawn against on December 31st, 1919	118 55
Agents' balances and premiums uncollected	919 86
Interest due or accrued and unpaid	89 96
Commissions paid in advance	890 61
Amount of all other assets	137 50
Total assets	$11,531 48

Liabilities.

Reserve of unearned premiums	$ 2,968 74
Amount of all other liabilities	895 61
Total amount of liabilities	$ 3,864 35
Capital stock paid up	2,750 00
Total amount of liabilities and paid-up capital	$ 6,614 35
Excess of assets over such total	$ 4,917 13

Receipts.

Net cash received for premiums	$ 2,310 35
Cash received for interest	539 87
Total receipts	$ 2,850 22

Expenditure.

Cash paid to agents for commission, salaries, and bonus	$ 709 82
„ for interest, discount, and exchange	5 55
„ „ statutory assessment and licence fees	5 15
„ „ rent and taxes	106 30
„ „ other expenses	133 96
Total expenses of management	$ 960 78
Amount paid for losses occurring prior to 1919	247 57
Amount paid for losses occurring during 1919	1,317 85
Cash paid for other expenditure	335 00
Total expenditure	$ 2,861 20

LIST OF SHAREHOLDERS.

Name.	Residence.	No. of Shares.	Amount subscribed.	Amount paid.
A. P. Bogardus	Vancouver	10	$ 1,000	$ 275 00
D. H. Wilson	"	14	1,400	385 00
R. W. Harris	"	14	1,400	385 00
W. H. Malkin	"	14	1,400	385 00
C. A. Wickens	"	8	800	220 00
P. G. Mason	"	8	800	220 00
J. P. Nicolls	"	5	500	137 50
I. Douglas	Boston, U.S.A.	12	1,200	330 00
M. Douglas	"	5	500	137 50
R. D. Douglas	Binghampton, U.S.A.	5	500	137 50
N. S. Douglas	" "	5	500	137 50
		100	$10,000	$2,750 00

STANDARD MARINE INSURANCE COMPANY, LIMITED.

Head Office—Liverpool, England.

Directors.

F. W. Pascoe Rutter, Chairman.
Jas. W. Alsop.
John H. Clayton.
Walter B. Duckworth.
A. Percy Eccles.
James G. Nicholson.

N. B. Barnes, Secretary.

Capital authorized and subscribed £500,000
Amount paid up 100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets.

	£	s.	d.
Investments and loans	958,584	3	7
Cash at bankers and in hand	104,839	16	0
Bills receivable	801	4	3
Sundry debtors	438,823	2	2
Accrued interest	13,460	13	4
Stamps in hand	916	4	7
Total assets	£1,517,425	3	11

Liabilities.

	£	s.	d.
Capital, 25,000 shares of £20 each, £4 per share paid	100,000	0	0
Reserve Fund	500,000	0	0
Reserve for unexpired risks	141,193	0	0
Provision for income-tax, 1919, and excess-profits duty, 1917 and 1918	130,599	15	0
Balance, Profit and Loss Account	59,593	10	8
Dividend for the year 1919	42,000	0	0
Bills payable	4,018	10	2
Claims outstanding	194,312	0	0
Sundry creditors	345,708	8	1
Total liabilities	£1,517,425	3	11

THE TOKIO MARINE & FIRE INSURANCE COMPANY, LIMITED.

Head Office—Tokio, Japan.

Directors.

M. Suyenobu, Chairman.
T. Abe.
S. Komuro.
Baron R. Kondo.
S. Sasaki.
H. Shoda.
Baron K. Sonoda.

Capital authorized and subscribed ..... Y. 15,000,000
Amount paid up 7,500,000

Statement for the Year ended December 31st, 1919.

Assets.

	Yen	sen.
Capital unpaid	7,500,000	00
Office premises, etc.	1,600,000	00
Japanese Government securities	5,320,279	78
British Government securities	3,676,681	25
United States Government securities	2,230,100	00
French Government securities	580,000	00
Canadian Government securities	90,000	00
Anglo-French 5% External Loan Bonds	90,000	00
Japanese and foreign municipal bonds	1,472,828	00
United States railway and other bonds and shares	1,828,400	00
Bonds and debentures of various companies	4,865,420	00
Shares in various companies	10,152,575	00
Loans on mortgage, etc.	21,179,380	16
Accounts due to the Company	1,641,324	25
Account due by Government under "War Risk Indemnity Act"	4,358	71
Amount due by Government under "War Risk Reinsurance Act"	118,915	46
Cash at bankers, on deposit and current account, and in hand	20,145,601	47
Total assets	82,495,864	08

Liabilities.

		Yen	sen.
Share capital		15,000,000	00
Legal Reserve Fund		3,000,000	00
Underwriting Fund—			
Underwriting Reserve	Y. 40,000,000 00		
„ Suspense	9,600,758 43		
		49,600,758	43
Staff Pension Fund		527,666	90
Accounts due by the Company		6,332,285	96
Premium due Government under "War Risk Reinsurance Act"		2,416	65
Profit and Loss Account		8,032,736	14
Total liabilities		82,495,864	08

THE WESTERN EMPIRE LIFE ASSURANCE COMPANY.

Head Office—Winnipeg, Man.

Directors.

William Smith, President.	F. D. Bryers.
R. W. Craig.	G. N. Broatch.
W. P. Rundle.	S. D. Hannah.
A. J. Fraser, M.D.	G. E. Graham.

F. C. O'Brien, Secretary.

Amount deposited with the Government of British Columbia: 27 Dominion Victory Loan bonds (par), $27,000.

Authorized capital	$1,000,000 00
Amount subscribed	736,100 00
Called capital	184,025 00
Amount paid up in cash	153,689 20

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets.

Cash value of real estate, less encumbrances	$ 15,319 60
Cash value of mortgages, exclusive of interest	90,980 65
Policy loans	20,415 70
Cash value (excluding interest and dividends) of stock, shares, bonds, debentures, etc.	162,270 50
Actual cash on hand at Head Office	3,140 27
Cash on deposit to the Company's credit and not drawn against on December 31st, 1919	12,848 98
Agents' balances	8,840 57
Premiums uncollected (net commissions deducted)	59,088 36
Bills receivable	19,617 20
Bills receivable on premiums on capital stock	93,412 80
Interest due or accrued and unpaid	10,839 93
Office furniture (not extended), $3,929.70.	
Total assets	$496,774 56

Liabilities.

Claims or losses adjusted	$ 1,393 88
Claims or losses in suspense or reported	9,500 00
Reinsurance reserve for life-insurance contracts in force	251,887 00
Amount of unpaid loans	42,000 00
Amount paid for advertising	1,316 28
Amount of all other liabilities	6,001 60
Total amount of liabilities	$312,098 76
Capital stock paid up	153,689 20
Total of liabilities and paid-up capital	$465,787 96
Excess of assets over such total	$ 31,986 60

Receipts.

Net premiums received in cash	$115,723 92
Cash received for interest	21,176 03
Cash received for calls on capital stock	26,911 80
Cash from all other sources	22,802 82
Cash received for debentures, mortgages, and other securities (not extended), $3,873.94.	
Total receipts	$186,614 57

Expenditure.

Cash paid to Agents for commission, salaries, and bonus	$ 34,557 21
„ for law costs	1,321 22
„ „ medical examiners' fees	4,886 25
„ „ interest, discount, and exchange	3,954 66
„ „ statutory assessment and licence fees	1,680 18
„ „ travelling expenses	861 70
„ „ rent and taxes	1,432 50
„ „ salaries, directors' and auditors' fees	15,446 10
„ „ printing, stationery, and advertising	3,240 41
„ „ postage, telegrams, and express	1,424 29
„ „ other expenses	9,715 70
Total expenses of management	$ 78,520 22
Net amount paid for losses	37,420 85
Cash paid for debentures, mortgages, or other securities (not extended), $76,139.18.	
Cash paid for dividends to policyholders	290 40
Cash paid for other expenditure	2,181 30
Total expenditure	$118,412 77

RETURNS FOR BRITISH COLUMBIA.

Deposit with Government, Victory Loan bonds (par)	$ 27,000 00
Assets (real estate, $15,319; mortgages, $13,000; loans, $1,411.95; cash, $1,628.31; agents' balances, $7,376.68; interest, $634.15)	39,370 69
Liabilities	14,094 40
Premiums received	7,432 64
Losses incurred, net	4,674 75
Losses paid, net	2,174 75
Net amount at risk	309,650 00

THE WORLD MARINE & GENERAL INSURANCE COMPANY, LIMITED.

Head Office—London, England.

Directors.

Sir Ivor Phillips, K.C.B., D.S.O., M.P., Chairman.

Herbert Ballard.
Norman S. Douglass.
John Godwin.
A. R. Marshall.
John Robertson.
Hon. J. C. Maxwell Scott.
Sir John B. Wimble, K.B.E.

Irving H. Cortazzi, Secretary.

Capital authorized and subscribed	£250,000
Amount paid up	100,000

STATEMENT FOR THE YEAR ENDED DECEMBER 31ST, 1919.

Assets

	£	s.	d.
By Investments at cost £1,046,088 4 4			
Less special reserve against depreciation in value 43,000 0 0			
	1,003,088	4	4
Sundry debtors	137,457	7	7
Interest and dividends accrued	7,366	17	0
Cash on deposit, at bankers, and in hand	68,635	3	10
Policy stamps	221	18	11
Total assets	£1,216,769	11	8

Liabilities.

	£	s.	d.
To Capital authorized, 50,000 shares of £5 each = £250,000.			
Capital issued, 50,000 shares of £5 each, £2 paid	100,000	0	0
Sundry creditors	193,149	8	10
Reserve Fund	200,000	0	0
Underwriting Suspense Account to meet all claims, excess-profits duty, and other liabilities on 1918 and previous years	300,000	0	0
Profit and Loss Account balance	37,933	12	8
Underwriting Account balance	385,686	10	2
Total liabilities	£1,216,769	11	8

LIST OF COMPANIES LICENSED UNDER THE "BRITISH COLUMBIA FIRE INSURANCE ACT," DECEMBER 31ST, 1919.

Name of the Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to October 11th, 1920.)
The Acadia Fire Insurance Company, Halifax, N.S.	F. W. Rounsefell, Vancouver.
Aetna Insurance Company, Hartford, Conn.	J. E. Kinsman, Victoria.
Agricultural Insurance Company, Watertown, N.Y.	J. J. Banfield, Vancouver.
Alliance Assurance Company, Limited, London, England	W. A. Anderson and H. Miskin, Vancou-
Alliance Insurance Company of Philadelphia	G. F. Rennie, Vancouver. [ver.
American Alliance Insurance Company, New York, N.Y.	O. D. Lampman, Vancouver.
American Central Insurance Company, St. Louis, Missouri	D. W. Campbell, Victoria.
American Equitable Assurance Company of New York, N.Y.	C. G. Hobson, Vancouver.
Atlas Assurance Company, Limited, London, England	John S. Gall, Vancouver.
Beaver Fire Insurance Company, Winnipeg, Man.	Waghorn, Gwynn & Co., Ltd., Vancouver.
Boston Insurance Company, Boston, Mass.	A. Z. DeLong, Vancouver.
British America Assurance Company, Toronto, Ontario	P. R. Brown, Victoria.
British Colonial Fire Insurance Company, Montreal, Que.	E. B. McDermid, Vancouver.
British Crown Assurance Corporation, Ltd., Glasgow, Scotland	A. S. Matthew, Vancouver.
British North Western Fire Insurance Company, Toronto, Ont.	W. A. Wand, Vancouver.
British Traders' Insurance Company, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Caledonian Insurance Company, Edinburgh, Scotland	Fred Burgess, Vancouver.
California Insurance Company, San Francisco, Cal.	A. W. Ross, Vancouver.
Canada Accident and Fire Assurance Co., Montreal, Que.	A. W. Ross, Vancouver.
Canada National Fire Insurance Company, Winnipeg, Man.	R. W. Perry, Victoria.
Canadian Fire Insurance Company, Winnipeg, Man.	F. C. Paterson, Victoria.
‡The Canadian Surety Company, Toronto, Ontario	Wm. Savage, Vancouver.
Car & General Insurance Corporation, Limited, London, Eng.	J. H. Lawson, Vancouver.
The Century Insurance Company, Limited, Edinburgh, Scotland	Thos. W. Greer, Vancouver.
The China Fire Insurance Company, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Citizens Insurance Company of Missouri, St. Louis, Mo.	Chas. H. Macaulay, Vancouver.
Commercial Union Assurance Company, Limited, London, England	A. W. Ross, Vancouver.
Commercial Union Fire Insurance Company of New York	A. W. Ross, Vancouver.
Connecticut Fire Insurance Company, Hartford, Conn.	Robt. H. Swinerton, Victoria.
Continental Insurance Company, New York, N.Y.	W. A. Lawson, Vancouver.
Dominion Fire Insurance Company, Toronto, Ontario	G. H. L. Hobson, Vancouver.
The Dominion of Canada Guarantee & Accident Insurance Company, Toronto, Ont.	E. P. Withrow, Vancouver.
The Eagle, Star & British Dominions Insurance Co., Ltd., London, England	R. J. Loewen and R. G. Harvey, Vancouver.
Employers Liability Assurance Corporation, Limited, London, Eng.	Jas. A. Young.
Equitable Fire & Marine Insurance Company, Providence, R.I.	A. M. Pound, Vancouver.
Fidelity Phenix Fire Insurance Company, New York, N.Y.	Arthur Coles, Victoria.
Fire Association of Philadelphia, Philadelphia, Pa.	Leeming Bros., Ltd., Victoria.
The Fire Insurance Company of Canada, Montreal, Quebec	C. G. Hobson, Vancouver.
Fireman's Fund Insurance Company, San Francisco, Cal.	E. D. Todd, Victoria.
Firemen's Insurance Company of Newark, New Jersey	C. B. Whitney, Vancouver.
General Accident Assurance Company of Canada, Toronto, Ont.	George Rorie, Vancouver.
General Accident Fire & Life Assurance Corporation, Limited, Perth, Scotland	E. J. Enthoven, Vancouver.
General Fire Assurance Company, Paris, France	A. W. McLeod, Vancouver.
Girard Fire & Marine Insurance Company, Philadelphia, Pa.	Richard R. Smith, Vancouver.
Glens Falls Insurance Company, Glens Falls, N.Y.	J. W. Stewart, Vancouver.
Globe & Rutgers Fire Insurance Company, New York, N.Y.	A. McC. Creery, Vancouver.
Globe Indemnity Co. of Canada, Montreal, Que.	F. W. Rounsefell, Vancouver.
Great American Insurance Company, New York, N.Y.	W. A. Wand, Vancouver.
Guardian Assurance Company, Limited, London, England	R. S. Day, Victoria.
Guardian Insurance Company of Canada, Montreal, Quebec	R. G. Heddle, Vancouver.
Hartford Fire Insurance Company, Hartford, Conn.	George Allan Kirk, Victoria.
Home Insurance Company, New York, N.Y.	H. W. Dyson, Vancouver.
Hudson Bay Insurance Company, Montreal, Que.	F. W. Walker, Vancouver.
†Imperial Guarantee & Accident Insurance Company of Canada, Toronto, Ont.	Donald Cramer, Vancouver.
Imperial Underwriters Corporation of Canada, Toronto	A. Waring Giles, Vernon.
Insurance Company of North America, Philadelphia, Pa.	G. F. Rennie, Vancouver.
The Insurance Company of the State of Pennsylvania, Philadelphia, Pa.	H. A. Robertson, Vancouver.
Law, Union & Rock Insurance Company, Limited, London, England	Wm. Thompson, Vancouver.
Liverpool & London & Globe Insurance Company, Limited, Liverpool, England	R. C. Hall, Victoria.
Liverpool-Manitoba Assurance Company, Montreal, Quebec	L. U. Conyers, Victoria.
London Assurance Corporation, London, England	Harold B. Girdwood, Victoria.
London & Lancashire Fire Insurance Company, Ltd., Liverpool, England	Wm. Thompson, Vancouver.
†London & Lancashire Guarantee & Accident Company of Canada, Toronto, Ontario	Wm. Thompson, Vancouver.
London Guarantee & Accident Co., Ltd., London, England	J. H. Watson, Vancouver.
London Mutual Fire Insurance Company of Canada, Toronto, Ont.	Christopher G. Hobson, Vancouver.
Marine Insurance Company, Limited, London, England	W. W. Johnston, Vancouver.
Mechanics & Traders Insurance Company, New Orleans, La.	W. S. Holland, Vancouver.
Mercantile Fire Insurance Company, Waterloo, Ontario	Wm. Thompson, Vancouver.
Merchants Fire Assurance Corporation of New York, N.Y.	C. G. Hobson, Vancouver.
Millers National Insurance Company, Chicago, Ill.	C. G. Hobson, Vancouver.
Mount Royal Assurance Company, Montreal, Quebec	C. G. Hobson, Vancouver.
National Ben Franklin Fire Insurance Company, Pittsburgh, Pa.	J. H. Johnston, Victoria.
National Benefit Assurance Co., Ltd., London, Eng.	J. T. Summerfield, Vancouver.
National Fire Insurance Company of Hartford, Hartford, Conn.	H. T. Barnes, Victoria.
The Nationale Fire Insurance Company, Paris, France	C. G. Hobson, Vancouver.

LIST OF COMPANIES LICENSED UNDER THE "BRITISH COLUMBIA FIRE INSURANCE ACT," DECEMBER 31ST, 1919—*Continued.*

Name of the Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to October 11th, 1920.)
National Union Fire Insurance Company, Pittsburgh, Pa.	E. E. Rand, Vancouver.
Newark Fire Insurance Company, Newark, N.J.	F. W. Walker, Vancouver.
New Hampshire Fire Insurance Co., Manchester, N.H.	A. Z. DeLong, Vancouver.
New Jersey Insurance Company, Newark, N.J.	H. A. Robertson, Vancouver.
Niagara Fire Insurance Company, New York, N.Y.	D. Leeming, Victoria.
Northern Assurance Company, Limited, London, England	Bernard C. Mess, Victoria.
§The North American Accident Insurance Co., Montreal, Quebec	J. Edward Sears, Vancouver.
North British & Mercantile Insurance Company, London, Eng.	R. H. Budd, Vancouver.
North Empire Fire Insurance Company, Winnipeg, Manitoba	John W. Wilson, Vancouver.
North West Fire Insurance Company, Winnipeg, Manitoba	Chas. H. C. Payne, Victoria.
Northwestern Mutual Fire Association, Seattle, Washington	N. B. Whitley, Vancouver.
Northwestern National Insurance Company, Milwaukee, Wis.	W. B. Blane, Vancouver.
Norwich Union Fire Insurance Society, Limited, Norwich, England	B. S. Heisterman, Victoria.
Ocean Accident & Guarantee Corporation, Limited, London, England	John R. Hannah, Vancouver.
Occidental Fire Insurance Company, Winnipeg, Manitoba	A. E. Short, Vancouver.
Pacific Coast Fire Insurance Company, Vancouver, B.C.	Thos. W. Greer, Vancouver.
Palatine Insurance Company, Limited, London, England	A. W. Ross, Vancouver.
The Phenix Fire Insurance Company of Paris, France	J. A. Griffith, Victoria.
Phoenix Assurance Company, Limited, London, England	F. W. Rounsefell, Vancouver.
The Phoenix Insurance Company, Hartford, Conn.	Arthur E. Haynes, Victoria.
Providence Washington Insurance Company, Providence, R.I.	Richard W. Douglas, Vancouver.
Provincial Insurance Co., Ltd., Bolton, England	W. B. Blane, Vancouver.
Quebec Fire Assurance Company, Quebec, Que.	Wm. Thompson, Vancouver.
Queen Insurance Company of America, New York	R. P. Rithet & Co., Ltd., Victoria.
Queensland Insurance Company, Limited, Sydney, Australia	C. Gardner-Johnson, Vancouver.
Royal Exchange Assurance, London, England	H. G. Lawson, Jr., Victoria.
Royal Insurance Company, Limited, Liverpool, England	F. W. Walker, Vancouver.
St. Paul Fire & Marine Insurance Company, St. Paul, Minn.	B. S. Heisterman, Victoria.
Scottish Metropolitan Assurance Co., Ltd., Edinburgh, Scotland	Lawrence W. Peel, Vancouver.
Scottish Union & National Insurance Company, Edinburgh, Scotland	Pemberton & Son, Victoria.
Springfield Fire & Marine Insurance Company, Springfield, Mass.	Chas. H. Macaulay, Vancouver.
Stuyvesant Insurance Company, New York, N.Y.	H. A. Robertson, Vancouver.
Sun Insurance Office, London, England	F. B. Pemberton, Victoria.
Union Assurance Society, Limited, London, England	D. C. McGregor, Vancouver.
The Union Fire Insurance Company, Paris, France	Franco-Canadian Trust & Mortgage Co., Vancouver.
Union Insurance Society of Canton, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver.
Union Marine Insurance Company, Limited, Liverpool, England	C. H. Macaulay, Vancouver.
United States Fire Insurance Company, New York, N.Y.	H. A. Robertson, Vancouver.
Vulcan Fire Insurance Company of Oakland, Cal.	T. W. Greer, Vancouver.
Western Assurance Company, Toronto, Ontario	R. W. Douglas, Vancouver.
Westchester Fire Insurance Company, New York, N.Y.	R. N. Ferguson, Victoria.
The Yang-tsze Insurance Association, Limited, Shanghai, China	B. G. D. Phillips, Vancouver.
Yorkshire Insurance Company, Limited, York, England	H. W. Dyson, Vancouver.

‡ Licence under "B.C. Fire Insurance Act" limited to insurance of automobiles against fire; also licensed under the "Insurance Act" to transact guarantee, burglary, plate glass, and automobile insurance.

† Licence under "B.C. Fire Insurance Act," limited to insurance of automobiles against fire; also licensed under the "Insurance Act" to transact guarantee, accident, sickness, automobile, and plate-glass insurance.

§ Licence under "B.C. Fire Insurance Act," limited to insuring automobiles against loss or damage by fire; also licensed under the "Insurance Act" to transact automobile, burglary, accident, sickness, and plate-glass insurance.

NOTE.—Licensed since December 31st, 1919:—

The British General Insurance Co., Ltd., London, England; J. H. Gillespie, Victoria.
Caledonian American Insurance Co., New York, N.Y.; Fred Burgess, Vancouver.
Canada Security Assurance Co., Toronto, Ont.; J. J. Banfield, Vancouver. (This company took over the company of same name incorporated in Alberta, which was licensed earlier in the year.)
The Canadian Indemnity Co., Winnipeg; A. McC. Creery, Vancouver.
Columbia Insurance Co., Jersey City, N.J.; F. W. Rounsefell, Vancouver.
Essex & Suffolk Equitable Insurance Society, Ltd., London, England; John G. Elliott, Victoria.
The Motor Union Insurance Co., Ltd., London, England; W. W. Johnston, Vancouver.
The Pacific Marine Insurance Co., Vancouver, B.C.; Leslie H. Wright, Vancouver.
Railway Passengers Assurance Co., London, England; P. H. Grant, Vancouver.
The Royal Scottish Insurance Co., Ltd., Glasgow, Scotland; J. H. Watson, Vancouver.
The Sterling Fire Insurance Company of Indiana, U.S.A.; H. R. Budd, Vancouver.
The Traders & General Insurance Association, Ltd., London, England; C. D. J. Christie, Vancouver.
The Wawanesa Mutual Insurance Co., Wawanesa, Manitoba (deposit, $25,000 War bonds); A. Quesnel, Lumby.

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Name of Company and Head Office.	Attorney to receive Process in British Columbia. (Corrected to October 11th, 1920.)	Description of Insurance Business for which Licensed. (Corrected to October 11th, 1920.)
Ætna Insurance Co., Hartford, Conn.	J. E. Kinsman, Victoria	* Automobile, marine, tornado, and inland transportation.
Ætna Life Insurance Co., Hartford, Conn.	John F. Brandt, Vancouver	Life.
American Alliance Insurance Co., New York, N.Y.	O. D. Lampman, Vancouver	* Automobile (excluding insurance against loss by reason of injury to the person).
Alliance Assurance Co., Ltd., London, Eng.	W. Anderson and H. Miskin, Vancouver	*Marine, accident, sickness, guarantee, automobile, burglary, plate glass, and hail.
Alliance Insurance Co. of Philadelphia, Pa.	G. F. Rennie, Vancouver	*Marine, automobile (excluding insurance against loss by reason of injury to the person), and inland transportation.
The Boiler Inspection & Insurance Co. of Canada, Toronto, Ont.	R. V. Winch & Co., Ltd., Vancouver	Steam-boiler.
Boston Insurance Co., Boston, Mass.	A. Z. DeLong, Vancouver	*Marine.
The British and Foreign Marine Insurance Co., Ltd., Liverpool, Eng.	B. C. Mess, Victoria	Marine, inland transportation, sprinkler leakage.
British America Assurance Co., Toronto, Ont.	P. R. Brown, Victoria	*Hail, ocean, marine, inland marine, inland transportation, and automobile.
(1.) The British Columbia Plate Glass Insurance Co., Vancouver, B.C.	Head Office, Vancouver	Plate glass.
British Crown Assurance Corporation, Ltd., Glasgow, Scotland	A. S. Matthew, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
British Traders Insurance Co., Ltd., Victoria, Hong Kong.	C. R. Elderton, Vancouver	*Automobile and marine.
The Canada Accident and Fire Assurance Co., Montreal, Que.	A. W. Ross, Vancouver	* Accident, sickness, plate glass, guarantee, burglary, and automobile.
Canada Life Assurance Co., Toronto, Ont.	F. W. Marsh, Vancouver	Life.
Canadian Fire Insurance Company, Winnipeg, Manitoba	F. C. Paterson, Victoria	*Automobile.
The Canadian Surety Co., Toronto, Ont.	William Savage, Vancouver	Guarantee, burglary, plate glass, and automobile. (Also licensed under "B.C. Fire Insurance Act" to insure automobiles against loss or damage by fire.)
The Canton Insurance Office, Limited, Victoria, Hong Kong	Wm. Monteith & Co., Ltd., Victoria	Marine.
The Capital Life Assurance Co. of Canada, Ottawa, Ont.	W. D. Kennedy, Vancouver	Life.
Car and General Insurance Corporation, Ltd., London, Eng.	J. H. Lawson, Vancouver	*Accident, hail, automobile, and sickness.
Confederation Life Association, Toronto, Ont.	J. L. Kerr, Vancouver	Life.
Continental Casualty Co., Hammond, Ind.	A. S. Matthew, Vancouver	Accident, sickness, and automobile.
Continental Insurance Company, New York, N.Y.	W. A. Lawson, Vancouver	*Tornado, explosion (including riot and civil commotion), and automobile (excluding insurance against loss by reason of bodily injury to the person).
The Continental Life Insurance Co., Toronto, Ont.	N. B. Bailey, Vancouver	Life.
The Crown Life Insurance Co., Toronto, Ont.	F. R. McD. Russell, Vancouver	Life.
The Dominion of Canada Guarantee & Accident Ins. Co., Toronto, Ont.	E. P. Withrow, Vancouver	*Accident, guarantee, sickness, burglary, and plate glass.
Dominion Gresham Guarantee & Casualty Co., Montreal, Que.	B. S. Brown, Vancouver	Accident, sickness, guarantee, burglary, and automobile.
The Dominion Life Assurance Co., Waterloo, Ont.	N. T. Truell, Vancouver	Life.
The Eagle Star & British Dominions Insurance Co., Ltd., London, Eng.	R. J. Loewen and R. G. Harvey, Vancouver.	*Marine and automobile (limited to insurance against loss or damage from accident or injury suffered by an employee or other person caused by an automobile for which the owner is liable).
Employers Liability Assurance Corporation, Ltd., London, Eng.	Jas. A. Young, Vancouver	*Accident, sickness, guarantee, automobile, burglary, steam-boiler, and plate glass.
Equitable Fire & Marine Insurance Co., Providence, R.I.	A. M. Pound, Vancouver	*Automobile (excluding insurance against loss by reason of bodily injury to the person).
The Equitable Life Assurance Society of U.S., New York, N.Y.	J. H. Campbell, Vancouver	Life.
The Excelsior Life Insurance Co., Toronto, Ont.	F. J. Gillespie, Vancouver	Life.
The Fidelity & Casualty Co., New York, N.Y.	Seeley & Co., Vancouver	Accident, sickness, burglary, steam-boiler, and plate glass.
Fidelity Phenix Fire Insurance Co., New York, N.Y.	Arthur Coles, Victoria	*Tornado, explosion (including riot and civil commotion), and automobile (excluding insurance against loss by reason of bodily injury to the person).
Fireman's Fund Insurance Co., San Francisco, Cal.	E. D. Todd, Victoria	*Marine, inland transportation, and insurance against loss or damage to automobiles by accident, burglary, or theft.
Firemen's Insurance Co. of Newark, N.J.	C. B. Whitney, Vancouver	* Marine.
General Accident Assurance Co. of Canada, Toronto, Ont.	D. Stuart MacLeod, Vancouver	* Accident, sickness, steam-boiler, and guarantee.
General Accident Fire & Life Assurance Corpn., Ltd., Perth, Scotland	E. J. Enthoven, Vancouver	* Automobile (excluding insurance against loss by reason of bodily injury to the person).
General Animals Insurance Co. of Canada, Montreal, Que.	R. W. Douglas, Vancouver	Live stock.
Glens Falls Insurance Co., Glens Falls, N.Y.	Jas. W. Stewart, Vancouver	* Hail, tornado, automobile, explosion (including riot and civil commotion) and inland transportation.
Globe Indemnity Co. of Canada, Montreal, Que.	F. W. Rounsefell, Vancouver	*Accident, sickness, burglary, automobile, guarantee, and forgery.
Globe & Rutgers Fire Insurance Co., New York, N.Y.	A. McC. Creery, Vancouver	* Inland transportation. Automobile (excluding insurance against loss by reason of bodily injury to the person), and explosion (except upon steam-boilers, pipes, fly-wheels, engines, and machinery connected therewith or operated thereby), and marine.
Great American Insurance Co., New York, N.Y.	W. A. Wand, Vancouver	*Hail, tornado, sprinkler leakage, marine, automobile (excluding insurance against loss by reason of bodily injury), explosion (including riot and civil commotion), inland transportation.
(2.) Great North Insurance Company, Calgary, Alta.	J. Edward Bird, Vancouver	Live stock.
The Great West Life Assurance Co., Winnipeg, Man.	J. A. Johnson, Vancouver	Life.
The Guarantee Company of North America, Montreal, Que.	C. A. Holland, Victoria	Guarantee.
Guardian Insurance Co. of Canada, Montreal, Que.	W. E. Graveley, Vancouver	* Accident, sickness, guarantee, plate glass, burglary, and automobile.
Hartford Fire Insurance Co., Hartford, Conn.	G. A. Kirk, Victoria	* Hail, explosion (including riot and civil commotion), inland transportation, cyclone or tornado, sprinkler leakage, and insurance against loss or damage to automobiles by accident, burglary, or theft.
Home Insurance Co., New York, N.Y.	H. W. Dyson, Vancouver	*Automobile, sprinkler leakage, hail, tornado, and explosion (including riot and civil commotion).
Imperial Guarantee & Accident Insurance Co. of Canada, Toronto, Ont.	D. Cramer, Vancouver	Guarantee, accident, sickness, automobile, and plate glass. (Also licensed under "B.C. Fire Insurance Act" to transact the business of insurance of automobiles against fire.)
Imperial Life Assurance Co. of Canada, Toronto, Ont.	Stanley Henderson, Vancouver	Life.
Insurance Company of North America, Philadelphia, Pa.	G. F. Rennie, Vancouver	*Inland transportation, automobile (excluding injury to the person), marine, and explosion (including riot and civil commotion).
Law, Union & Rock Insurance Co., Ltd., London, Eng.	Wm. Thompson, Vancouver	*Accident and sickness.
Liverpool-Manitoba Assurance Company, Montreal, Quebec	L. U. Conyers, Victoria	* Explosion (including riot and civil commotion).
Lloyds Plate Glass Insurance Co., New York, N.Y.	C. A. MacMorran, Vancouver	Plate glass.
London Assurance Corporation, London, Eng.	R. V. Winch & Co., Ltd., Victoria	* Marine and automobile.
London Guarantee & Accident Co., Ltd., London, Eng.	J. H. Watson, Vancouver	*Accident, sickness, guarantee, and burglary.
The London Life Insurance Co., London, Ont.	William B. Ryan, Victoria	Life.
The London & Lancashire Guarantee & Accident Co. of Canada, Toronto, Ont.	Wm. Thompson, Vancouver	Accident, sickness, guarantee, plate glass, and automobile.
London & Scottish Assurance Corporation, Limited, London, England	Lawrence W. Peel	Life.
London & Provincial Marine & General Insurance Co., Ltd., London, Eng.	R. V. Winch & Co., Ltd., Victoria	Marine.
Loyal Protective Insurance Co., Boston, Mass.	G. H. Grant, Vancouver	Accident and sickness amongst members of I.O.O.F.
The Manufacturers Life Insurance Co., Toronto, Ont.	W. B. Barwis, Vancouver	Life.
The Marine Insurance Co., Ltd., London, Eng.	W. W. Johnston, Vancouver	* Inland transportation, automobile, marine, and inland marine.
Maritime Insurance Co., Ltd., Liverpool, Eng.	R. P. Rithet & Co., Ltd., Victoria	Marine.
Maryland Assurance Corporation, Baltimore, Md.	L. A. Genge, Victoria	Accident and sickness.
Maryland Casualty Co., Baltimore, Maryland	J. H. Lawson, Victoria	Accident, burglary, guarantee, plate glass, steam-boiler, and sickness.
Merchants Casualty Co., Winnipeg, Man.	J. B. Love, Vancouver	Accident (excluding employers' liability) and sickness.
Metropolitan Life Insurance Co., New York, N.Y.	Wm. Murphy, Victoria	Life.
The Monarch Life Assurance Co., Winnipeg, Man.	R. W. Harris, Vancouver	Life.
Mutual Life Assurance Co. of Canada, Waterloo, Ont.	W. J. Twiss, Vancouver	Life.
The Mutual Life Insurance Co. of New York, N.Y.	A. Callander, Vancouver	Life.
National Benefit Assurance Company, Ltd., London, England	J. T. Summerfield, Vancouver	* Marine, accident, and sickness.
National Life Assurance Co. of Canada, Toronto, Ont.	Lindley Crease, Victoria	Life.
National Provincial Plate Glass & General Insurance Co., Ltd., London, Eng.	F. W. Rounsefell, Vancouver	Plate glass.
National Surety Co., New York, N.Y.	R. V. Winch, Vancouver	Guarantee, burglary, and forgery.
Newark Fire Insurance Co., Newark, N.J.	F. W. Walker, Vancouver	* Marine and automobile (excluding insurance against loss by reason of injury to the person).
New Jersey Insurance Company, Newark, N.J.	H. A. Robertson, Vancouver	* Automobile (excluding insurance against loss by reason of injury to the person).
New York Life Insurance Co., New York, N.Y.	R. A. Durham, Vancouver	Life.
New York Plate Glass Insurance Co., New York, N.Y.	A. S. Matthew, Vancouver	Plate glass.
New Zealand Insurance Company, Ltd., Auckland, New Zealand	J. T. Summerfield, Vancouver	Marine.
Niagara Fire Insurance Co., New York, N.Y.	D. Leeming, Victoria	*Tornado, automobile (including damage to automobiles in transit by rail), marine, and explosion (including riot and civil commotion).
The North American Accident Insurance Co., Montreal	J. E. Sears, Vancouver	*Accident, sickness, plate glass, automobile, and burglary.
North American Life Assurance Co., Toronto, Ont.	Ellis W. Keenleyside, Vancouver	Life.
Northern Assurance Company, Ltd., London, England	R. V. Winch & Co., Ltd., Vancouver	*Marine, accident, sickness, automobile, guarantee, and plate glass.
Northern Life Assurance Co. of Canada, London, Ont.	W. H. Clarke, Vancouver	Life.
Northwestern Mutual Fire Association, Seattle, Washington	N. B. Whitley, Vancouver	Automobile (excluding insurance against loss by reason of bodily injury to the person).
Northwestern National Insurance Co., Milwaukee, Wis.	J. Edward Sears, Vancouver	*Automobile.
Norwich Union Fire Insurance Society, Ltd., Norwich, Eng.	B. S. Heisterman, Victoria	*Accident, sickness, plate glass, automobile.
Norwich Union Life Insurance Society, Norwich, Eng.	B. S. Heisterman, Victoria	Life.
The Ocean Accident & Guarantee Corporation, Ltd., London, Eng.	J. R. Hannah, Vancouver	*Accident, sickness, guarantee, plate glass, automobile, and burglary.
Occidental Fire Insurance Company, Winnipeg, Manitoba	A. E. Short, Vancouver	*Automobile.
Ocean Marine Insurance Co., Ltd., London, Eng.	R. V. Winch & Co., Ltd., Victoria	Marine.
Phoenix Assurance Co., Ltd., London, Eng.	F. W. Rounsefell, Vancouver	*Life.
Phoenix Insurance Co., Hartford, Conn.	A. E. Haynes, Victoria	*Marine and automobile (excluding insurance against loss by reason of injury to the person).
Protective Association of Canada, Granby, Que.	F. G. Bell, Vancouver	Accident and sickness restricted to members of the Masonic Order.
The Prudential Insurance Co. of America, Newark, N.J.	B. F. Ogilvie, Vancouver	Life.
Queen Insurance Co. of America, New York, N.Y.	R. P. Rithet & Co., Ltd., Victoria	*Automobile and inland transportation.
Queensland Insurance Co., Ltd., Sydney, Australia	C. Gardiner Johnson, Vancouver	Marine.
Railway Passengers Assurance Co., London, Eng.	P. H. Grant, Vancouver	Accident, sickness, guarantee, plate glass, and automobile.
The Ridgely Protective Association, Worcester, Mass.	John Dunlop, Nelson	Accident and sickness amongst members of I.O.O.F.
Reliance Marine Insurance Co., Liverpool, Eng.	R. P. Rithet & Co., Ltd., Victoria	Marine.
Royal Exchange Assurance, London, Eng.	H. G. Lawson, Jr., Victoria	*Accident, sickness, and automobile.
Royal Insurance Co., Ltd., Liverpool, Eng.	F. W. Walker, Vancouver	*Life and marine.
(3.) Royal Plate Glass Insurance Company of Canada, Vancouver, B.C.	Head Office, Vancouver	Plate glass.
St. Paul Fire & Marine Insurance Co., St. Paul, Minn.	B. S. Heisterman, Victoria	*Automobile, inland transportation, and marine.
Scottish Metropolitan Assurance Corporation, Limited, Edinburgh, Scotland	Lawrence W. Peel, Vancouver	*Accident, sickness, guarantee, automobile, marine, and inland marine.
Scottish Union & National Insurance Co., Edinburgh, Scotland	F. B. Pemberton, Victoria	Tornado, sprinkler leakage, and automobile.
The Sovereign Life Assurance Co., Winnipeg, Man.	V. L. Stokoe, Vancouver	Life.
The Standard Life Assurance Co., Edinburgh, Scotland	J. W. Kerr, Vancouver	Life.
Standard Marine Insurance Co., Ltd., Liverpool, Eng.	C. Gardner Johnson, Vancouver	Marine.
Sun Life Assurance Co. of Canada, Montreal, Que.	H. O. Leach, Vancouver	Life.
Tokio Marine & Fire Insurance Co., Tokio, Japan	B. G. D. Phillips, Vancouver	Marine.
Travelers Indemnity Company, Hartford, Conn.	R. C. Hall, Victoria	Accident, sickness, steam-boiler, plate glass, burglary, automobile, fly-wheel.
The Travelers Insurance Co., Hartford, Conn.	R. C. Hall, Victoria	Life and accident.
Travellers Life Assurance Co. of Canada, Montreal, Que.	J. D. Mather, Vancouver	Life.
Union Insurance Society of Canton, Ltd., Victoria, Hong Kong	C. R. Elderton, Vancouver	*Marine and automobile.
Union Marine Insurance Company, Ltd., Liverpool, Eng.	C. H. Macaulay, Vancouver	Marine, inland marine, inland transportation, accident, automobile.
Union Mutual Life Insurance Co., Portland, Maine	Viggo F. Laursen, Vancouver	Life.
United States Fidelity & Guaranty Co., Baltimore, Md.	Leslie H. Wright, Vancouver	Guarantee, accident, sickness, burglary, plate glass, and steam-boiler.
United States Fire Insurance Co., New York, N.Y.	H. A. Robertson, Vancouver	* Automobile (excluding insurance against loss by reason of injury to the person and explosion, (including riot and civil commotion).
United States Lloyds, Inc., New York, N.Y.	B. G. D. Phillips, Vancouver	Marine.
Western Assurance Company, Toronto, Ont.	R. W. Douglas, Vancouver	*Marine, inland transportation, explosion (including riot and civil commotion), tornado, and automobile.
Western Casualty Company, Denver, Colorado	W. H. Biegel, Vancouver	Accident and sickness.
(4.) Western Empire Life Assurance Co., Winnipeg, Man.	C. Wilson, Vancouver	Life.
Western Life Assurance Co., Winnipeg, Man.	C. E. Mahon	Life.
Westchester Fire Insurance Company, New York, N.Y.	R. N. Ferguson, Victoria	* Explosion (including riot and civil commotion).
The World Marine & General Insurance Co., Ltd., London, Eng.	B. C. Mess, Victoria	Marine.
The Yang-tsze Insurance Association, Ltd., Shanghai, China	B. G. D. Phillips, Vancouver	Marine.
Yorkshire Insurance Co., Ltd., York, Eng.	H. W. Dyson, Vancouver	*Accident, sickness, plate glass, and live stock.

* Also licensed under "B.C. Fire Insurance Act" to transact fire insurance.

Securities (par value) deposited under the Act:—

(1.) War Loan Bonds, $1,000; Municipal Securities, $5,000; B.C. Inscribed Stock, $973.32.
(2.) Cash, $5,000.
(3.) Dominion War Loan Bonds, $5,000, and deposit receipt, Canadian Bank of Commerce, $125.
(4.) Dominion War Loan Bonds, $27,000.

NOTE.—Licensed since December 31st, 1919:—

American Central Insurance Co., St. Louis, Mo.; D. W. Campbell, Victoria; automobile, explosion, and tornado.
Canada Security Assurance Co., Toronto, Ontario; John J. Banfield, Vancouver; automobile. (This company took over the company of same name incorporated in Alberta which was licensed earlier in the year.)
Columbia Insurance Co., Jersey City, N.J.; F. W. Rounsefell, Vancouver; automobile and inland transportation.
Hartford Accident and Indemnity Co., Hartford, Conn.; R. H. Budd, Vancouver; accident, automobile, burglary, guarantee, live stock, plate glass, and sickness.
London Mutual Fire Insurance Co., Toronto, Ont.; C. G. Hobson, Vancouver; automobile.
Lumbermen's Mutual Casualty Co., Chicago, Ill.; J. H. Constantine; automobile.
The Motor Union Insurance Co., Ltd., London, England; W. W. Johnston, Vancouver; accident and automobile.
Pacific Marine Insurance Co., Vancouver, B.C.; Leslie H. Wright, Vancouver; automobile and inland transportation.
The Palatine Insurance Co., Ltd., London, England; A. W. Ross, Vancouver; automobile.
The Preferred Accident Insurance Company of New York.; J. S. Gall, Vancouver; accident, sickness, and automobile.
Sterling Fire Insurance Company of Indiana, U.S.A.; J. H. Constantine; Tornado.

Maryland Assurance Corporation ceased business.

TABLE I.—NET FIRE INSURANCE PREMIUMS AND NET LOSSES, 1919.

Name of Company.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
Acadia Fire Insurance Co	$ 29,055 08	$ 15,019 76	$ 12,725 07
Aetna Fire Insurance Co	67,923 34	11,878 45	9,226 48
Agricultural Insurance Co	17,396 65	6,212 42	6,159 31
Alliance Assurance Co., Ltd	22,318 78	3,252 56	3,252 56
Alliance Insurance Co. of Philadelphia	27,779 32	8,819 90	5,128 49
American Alliance Insurance Co	5,013 41	1,665 66	1,671 66
American Central Insurance Co	14,403 12	1,388 76	1,281 26
Atlas Assurance Co., Ltd	26,749 40	1,630 69	1,610 69
Beaver Fire Insurance Co	6,198 19	170 00	302 23
Boston Insurance Co	34,315 03	17,490 71	10,161 28
British America Assurance Co	74,003 74	30,887 35	28,851 35
British Colonial Fire Insurance Co	16,582 39	8,693 08	8,693 08
British Crown Assurance Corporation, Ltd	92,212 26	42,148 46	37,271 48
British Northwestern Fire Insurance Co	4,137 13	1,165 36	1,165 36
British Traders Insurance Co., Ltd	29,697 28	2,421 24	2,421 24
Caledonian Insurance Co	38,521 15	7,226 72	6,804 50
California Insurance Co	29,097 46	6,305 25	9,603 48
Canada Accident & Fire Assurance Co	26,396 56	3,646 14	8,515 62
Canada National Fire Insurance Co	29,272 13	5,996 16	6,996 16
Canadian Fire Insurance Co	26,236 77	5,406 49	4,851 49
Canadian Surety Co	383 05	*Nil.*	*Nil.*
Car & General Insurance Corporation, Ltd	10,639 25	7,430 46	7,405 46
Century Insurance Co., Ltd	30,848 62	5,639 06	4,850 81
China Fire Insurance Co., Ltd	4,294 00	*Nil.*	*Nil.*
Citizens Insurance Co. of Missouri	39,755 56	3,858 38	3,708 78
Commercial Union Assurance Co., Ltd	112,046 87	20,657 99	27,154 32
Commercial Union Fire Insurance Co. of N.Y	7,793 21	552 64	444 36
Connecticut Fire Insurance Co	43,013 79	8,794 98	8,651 16
Continental Insurance Co	45,778 70	14,692 31	7,525 78
Dominion Fire Insurance Co	15,796 65	3,252 83	3,252 83
Dominion of Canada Guarantee & Accident Insurance Co	3,903 26	367 51	485 82
Eagle Star & British Dominions Insurance Co., Ltd	31,158 70	8,987 12	8,883 04
Employers Liability Assurance Corporation, Ltd	55,532 84	9,103 88	7,270 83
Equitable Fire & Marine Insurance Co	6,859 64	688 65	1,887 65
Fidelity Phenix Fire Insurance Co	54,171 81	9,639 39	6,904 59
Fire Association of Philadelphia	22,434 22	4,815 50	2,758 77
Fire Insurance Co. of Canada	16,647 99	469 46	105 15
Fireman's Fund Insurance Co	69,995 31	30,799 65	35,834 63
Firemen's Insurance Co. of Newark	7,696 89	1,935 67	5,136 11
General Accident Assurance Co. of Canada	6,352 47	12 50	12 50
General Accident Fire & Life Assurance Corporation, Ltd	31,607 29	9,299 31	9,938 89
General Fire Assurance Co. of Paris	14,649 12	9,807 87	9,020 87
Girard Fire & Marine Insurance Co	34 52	2,665 00	39 00
Glens Falls Insurance Co	15,196 45	5,650 36	5,165 56
Globe & Rutgers Fire Insurance Co	41,081 66	17,981 97	24,568 38
Globe Indemnity Co. of Canada	13,308 87	3,702 62	3,362 62
Great American Insurance Co	33,909 75	12,007 67	9,526 67
Guardian Assurance Co., Ltd	96,336 95	45,187 27	44,147 27
Guardian Insurance Co. of Canada	12,165 42	8 40	8 40
Hartford Fire Insurance Co	121,762 52	20,535 39	26,433 74
Home Insurance Co	82,642 06	43,511 74	17,253 93
Hudson Bay Insurance Co	39,882 44	5,910 28	5,930 28
Imperial Guarantee & Accident Insurance Co. of Canada	3,387 45	1,494 17	2,084 48
Imperial Underwriters Corporation of Canada	48,534 73	10,918 08	9,922 99
Insurance Co. of North America	91,174 68	26,673 65	25,190 12
Insurance Co. of State of Pennsylvania	43,646 21	8,169 05	6,831 35
Law, Union & Rock Insurance Co., Ltd	13,335 04	1,350 08	2,501 70
Liverpool & London & Globe Insurance Co	150,172 63	50,891 86	43,231 96
Liverpool-Manitoba Assurance Co	45,196 09	11,507 52	13,760 64
London Assurance Corporation	82,189 69	15,131 94	8,016 48
London & Lancashire Fire Insurance Co., Ltd	103,970 61	21,133 63	23,295 93
London & Lancashire Guarantee & Accident Co. of Canada	1,295 26	*Nil.*	*Nil.*
London Guarantee & Accident Co., Ltd	29,658 52	17,703 33	21,038 30
London Mutual Fire Insurance Co. of Canada	51,271 87	12,627 56	8,233 79
Marine Insurance Co., Ltd	7,247 10	2,690 69	2,955 00
Mechanics & Traders Insurance Co	27,854 04	16,844 22	19,537 59
Mercantile Fire Insurance Co	27,365 48	4,775 70	5,075 70
Merchants Fire Assurance Corporation of N.Y	29,774 04	3,341 77	2,441 77
Millers National Insurance Co	4,784 83	328 64	296 30
Mount Royal Assurance Co	52,623 68	12,668 18	12,665 97
National Ben Franklin Fire Insurance Co	19,915 39	2,312 32	2,312 32
National Benefit Assurance Co., Ltd	9,026 35	2,215 55	2,215 55
National Fire Insurance Co. of Hartford	77,030 72	26,415 75	28,734 25
The Nationale Fire Insurance Co., Paris	41,226 05	4,026 85	4,171 72
National Union Fire Insurance Co	17,300 05	5,443 00	2,243 95
Newark Fire Insurance Co	12,299 53	6,812 02	6,732 02
New Hampshire Fire Insurance Co	12,288 36	10,462 15	3,216 95
New Jersey Insurance Co	29,301 24	1,905 90	2,061 93
Niagara Fire Insurance Co	49,914 09	18,001 53	18,166 53
Northern Assurance Co., Ltd	95,701 90	31,729 00	32,116 00
North American Accident Insurance Co	146 13	29 30	29 30
North British & Mercantile Insurance Co	71,321 21	19,293 88	18,216 13
North Empire Fire Insurance Co	16,586 21	4,462 43	4,462 43
North West Fire Insurance Co	11,458 33	1,377 61	1,417 97
Carried forward	$2,981,986 61	$842,128 38	$787,447 81

TABLE I.—NET FIRE INSURANCE, ETC.—*Continued.*

Company.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
Brought forward	$2,981,986 61	$842,128 38	$787,447 81
Northwestern Mutual Fire Association	34,429 59	100 04	100 04
Northwestern National Insurance Co	37,718 41	2,480 21	836 01
Norwich Union Fire Insurance Society, Ltd	82,986 01	38,744 52	35,601 04
Ocean Accident & Guarantee Corporation, Ltd	14,639 84	1,292 35	1,297 35
Occidental Fire Insurance Co	7,625 30	2,260 78	2,142 63
Pacific Coast Fire Insurance Co	31,323 57	4,679 91	4,651 75
Palatine Insurance Co	41,744 09	16,270 62	20,770 29
Phenix Fire Insurance Co. of Paris	12,554 24	2,549 52	2,442 52
Phoenix Assurance Co., Ltd	256,742 35	109,990 41	95,414 00
Phoenix Insurance Co. of Hartford	48,214 79	10,482 91	13,533 91
Providence Washington Insurance Co	28,002 17	11,062 65	10,471 94
Provincial Insurance Co., Ltd	6,669 73	814 96	914 96
Quebec Fire Assurance Co	19,376 18	1,816 59	1,816 59
Queen Insurance Co. of America	78,382 04	16,633 67	16,478 67
Queensland Insurance Co., Ltd	12,886 89	14,157 41	15,157 41
Royal Exchange Assurance	37,102 64	13,502 37	12,750 07
Royal Insurance Co., Ltd	119,953 34	48,829 45	48,737 45
St. Paul Fire & Marine Insurance Co	29,112 86	10,714 76	10,926 56
Scottish Metropolitan Assurance Co., Ltd	12,482 99	*Nil.*	*Nil.*
Scottish Union & National Insurance Co	55,156 33	7,612 41	7,753 41
Springfield Farm & Marine Insurance Co	61,053 06	10,450 47	11,824 56
Stuyvesant Insurance Co	19,470 80	4,110 09	24 10
Sun Insurance Office	66,317 68	10,436 83	9,568 56
Union Assurance Society, Ltd	51,559 63	9,705 62	11,030 36
Union Fire Insurance Co. of Paris	21,559 48	9,342 92	9,360 42
Union Insurance Society of Canton, Ltd	37,684 63	7,423 33	7,238 33
Union Marine Insurance Co., Ltd	4,801 90	233 59	233 59
United States Fire Insurance Co	10,731 03	*Nil.*	*Nil.*
Vulcan Fire Insurance Co. of Oakland	8,392 98	414 93	280 53
Western Assurance Co	75,777 10	26,773 21	26,373 82
Westchester Fire Insurance Co	32,527,60	19,853 10	11,450 50
Yang Tsze Insurance Association, Ltd	2,278 93	*Nil.*	*Nil.*
Yorkshire Insurance Co., Ltd	28,688 19	5,115 27	4,566 99
Total	$4,370,432 98	$1,259,983 28	$1,181,196 47

TABLE II.—FIRE INSURANCE SUMMARY.

Year.	Net Premiums.	Net Amount of Losses incurred.	Net Amount of Losses paid.
1915	$3,180,168 66	$1,176,835 11	$1,313,759 23
1916	3,121,885 87	1,378,764 79	1,290,641 50
1917	3,609,442 65	887,639 01	958,460 60
1918	4,085,219 68	1,214,162 65	1,120,475 80
1919	4,370,432 98	1,259,983 28	1,181,196 47
Totals	$8,367,149 84	$5,917,384 84	$5,864,533 60

TABLE III.—DISPOSITION OF PREMIUMS RECEIVED.

	1917.	1918.	1919.
Rate of losses paid per cent. of premiums received	52.42	53.84	41.67
Rate of dividend or bonus to stockholders per cent. of premiums received (Canadian companies only)	7.90	2.79	4.74
Rate of general expenses per cent. of premiums received	32.94	35.61	36.56
Rate of premiums charged per cent. of risks taken	1.07	1.06	1.06

NOTE.—The figures are taken from the reports of the Superintendent of Insurance for the Dominion for 1918-19-20, and cover the business throughout Canada of the companies to which they refer.

TABLE IV.—RATIO OF LOSSES INCURRED TO PREMIUMS WRITTEN IN THE VARIOUS PROVINCES.

Provinces.	1919.	1918.	1917.	1916.
Alberta	34.60	44.64	32.87	47.90
British Columbia	29.84	29.79	25.40	45.00
Manitoba	25.25	62.38	59.15	52.09
New Brunswick	52.48	42.89	59.54	60.50
Nova Scotia	50.32	28.40	69.29	50.16
Ontario	40.89	59.47	62.77	77.46
Prince Edward Island	46.87	20.55	48.52	210.13
Quebec	50.54	52.69	60.98	49.18
Saskatchewan	39.23	48.74	44.44	39.72
Yukon	....	5.86	5.26	....
Totals	41.10	50.76	55.62	58.78

NOTE.—The figures are abstracted from the report for 1919 of the Superintendent of Insurance for the Dominion.

TABLE V.—FIRES REPORTED.

Districts reporting.	Number.	Amount of Loss.
City Municipalities (35).		
Alberni	...	.....
Armstrong	10	$ 33,815
Chilliwack	3	8,301
Courtenay	3	26,500
Cranbrook	7	32,580
Cumberland	3	550
Duncan	1	9
Enderby	1	484
Fernie	13	8,081
Grand Forks	5	2,600
Greenwood	1	900
Kamloops	16	30,418
Kaslo	2	1,593
Kelowna	9	14,004
Ladysmith	2	98
Merritt	1	85
Nanaimo	22	8,941
Nelson	21	22,290
New Westminster	40	10,989
North Vancouver	28	18,944
Phoenix	3	2,054
Porth Alberni	3	771
Port Coquitlam	2	900
Port Moody	3	3,133
Prince George	8	9,225
Prince Rupert	10	7,713
Revelstoke	8	6,721
Rossland	18	12,904
Salmon Arm	2	2,909
Sandon	...	.....
Slocan	3	11,594
Trail	11	10,497
Vancouver	423	609,739
Vernon	8	25,366
Victoria	163	89,182
Totals	853	1,013,890
District Municipalities (28).		
Burnaby	14	12,099
Chilliwack	9	31,555
Coldstream	...	.....
Coquitlam	2	3,274
Delta	2	2,481
Esquimalt	9	5,168
Fraser Mills	1	642
Kent	7	3,285
Langley	6	29,292
Maple Ridge	7	8,156
Matsqui	1	2,656
Mission	10	40,304
North Cowichan	3	10,919
North Vancouver	3	10,638
Oak Bay	6	691
Peachland	1	650
Penticton	11	2,275
Pitt Meadows	...	.....
Point Grey	23	35,235

TABLE V.—FIRES REPORTED—*Continued.*

Districts reporting.	Number.	Amount of Loss.
District Municipalities—Continued.		
Richmond	20	$ 147,117
Saanich	17	20,389
Salmon Arm	1	38
South Vancouver	34	13,998
Spallumcheen	1	2,800
Sumas	...	.....
Summerland	4	11,632
Surrey	4	6,435
West Vancouver	8	11,537
Totals	204	$413,266
Insurance Districts (15).		
Boundary	8	34,003
Fort George	6	18,307
Fort St. John	...	.....
Hazelton	7	14,528
Kamloops	3	4,682
Kootenay, North-east	7	29,213
Kootenay, South-east	24	101,291
Kootenay, West	29	109,948
Lillooet	6	8,522
Nanaimo, West Coast	19	38,920
Prince Rupert	10	22,675
Vancouver-New Westminster	20	79,038
Vernon	5	2,090
Victoria	9	17,576
Yale	11	19,943
Totals	164	$ 500,736
Grand Totals	1,221	$1,927,892

NOTE.—Construction of buildings—

Fire-resisting	6,	loss $	92,392
Brick	94,	,,	69,824
Frame	1,121,	,,	1,765,676
	1,221,	,,	$1,927,892

Average loss per diem $5,281.89.

Loss *per capita*—

The Province, estimated population, 425,000	$4 50
City of Vancouver, estimated population, 130,000	4 60
City of Victoria, estimated population, 55,000	1 70
City of New Westminster, estimated population, 16,500	60
City of Fernie, estimated population, 5,000	1 60
City of Nelson, estimated population, 6,000	3 70

TABLE VI.—CAUSES OF FIRES.

Causes of Fires.	Number.	Amount of Loss.
Ashes against wood	16	$ 83,325
Ashes thrown overboard set fire to oil on water	1	400
Back-draught from furnace	1	35
Barrel of oil under burner upset	1	419
Bottle of alcohol exploding	1	46
Bottle of patent stove-polish upset on stove	1	15
Brooder insufficiently protected	1	56
Caldron for cement boiled over	1	273
Candle carelessness	11	4,884
Carburettor back-firing	10	2,000
Children playing with lighted paper	1	50
Child playing before fireplace with celluloid comb	1	15
Clothes too near stove	20	5,295
Coal-oil carelessness	3	441
Coffee-urn upset	1	452
Converter-flue insufficiently protected	1	7,450
Curtain from lamp or stove	3	910
Defective chimney	68	83,554
Defective fireplace	24	5,719
Defective forge	1	45
Defective furnace or furnace-pipes	5	11,355
Defective lamp	1	40
Defective oven	2	1,086
Defective stove or stove-pipes	22	36,862
Defective wiring	11	12,064
Drying wood in stove	1	2,200
Duster from gas-jet	1	10
Electrical appliances	31	9,764
Exposure	97	98,036
Fire built by workmen on concrete floor set fire to joists	1	50
Fire-crackers	4	116
Friction in felting-machine	1	1,150
Fumigation	1	15
Furnace explosion	1	20
Furnace or furnace-pipes insufficiently protected	4	2,878
Gas escaping from still	1	300
Gas explosion	2	335
Gasolene carelessness	14	13,388
Grease on stove or range	4	89
Hot bearing	2	41,531
Incendiary	20	48,712
Lamp explosion	5	4,641
Lamp upset	10	4,458
Lightning	6	12,524
Live coals	4	145
Match carelessness	30	20,033
Matches, children with	22	6,111
Mattress against chimney or furnace	2	3,715
Mosquito-smudge	2	2,275
Motor setting fire to ceiling	1	10
Oil-burners back-firing	1	828
Oil-stove explosion	12	1,740
Oil-tank overheated	1	1,330
Overresistance	1	15
Paper too close to stove	3	210
Phosphorus in cupboard	1	35
Pumpkin-lantern upset	1	12
Purse fell into fire	1	2
Screen too close to stove	1	10
Short circuit	24	14,940
Smokers' carelessness	61	19,343
Sparks from boiler	6	64,116
Sparks from burner	12	66,348
Sparks from burning rubbish	7	12,327
Sparks from bush fire	18	28,047
Sparks from chimney	278	102,170
Sparks from fireplace	21	367
Sparks from forge	3	805
Sparks from friction	1	103
Sparks from furnace	7	35,207
Sparks from locomotive	4	46,046
Sparks from stove	14	15,131
Sparks from tractor	1	550
Spontaneous combustion	23	67,317
Static electricity	1	250
Stove explosion	1	50
Stove or stove-pipe insufficiently protected	63	37,560
Tar boiling over	4	3,178
Thawing pipes	1	10
Torch explosion	2	280
Torch ignited woodwork	8	314
Torch near overflooded oil-burner	1	100
Trolly-wire	1	30
Unknown	158	878,438
Wood on furnace	1	135
Wood too close to stove	3	1,251
Totals	1,221	$1,927,892

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES.

Property.		Causes.		Amount of Loss.	
Apartments	17	Clothes too near stove	2	$ 52	
		Defective fireplace	1	656	
		Defective stove	1	10	
		Electric appliances	2	35	
		Live coals	1	8	
		Match carelessness	1	550	
		Matches, children with	1	13	
		Smokers, carelessness	2	26	
		Sparks from chimney	2	2,475	
		Sparks from furnace	1	75	
		Stove-pipe insufficiently protected	1	30	
		Unknown	2	518	
		Carburettor back-firing	7	$ 1,790	
					$ 4,448
Automobiles	17	Defective wiring	1	11	
		Exposure	1	55	
		Gasolene carelessness	3	413	
		Unknown	2	1,475	
		Short circuit	3	916	
					4,660
Banks	2	Defective fireplace	1	$ 12	
		Exposure	1	3,813	
					3,825
Bakeries	3	Oven insufficiently protected	1	$ 1,011	
		Short circuit	1	125	
		Unknown	1	650	
					1,786
Barns	12	Coal-oil carelessness	1	$ 300	
		Exposure	1	500	
		Incendiary	1	750	
		Lamp upset	1	500	
		Lightning	1	681	
		Matches, children with	1	1,000	
		Sparks from bush fire	1	125	
		Unknown	5	23,854	
					27,710
Barber-shops	2	Defective stove	1	$ 415	
		Incendiary	1	7,775	
					8,190
Barracks	1	Sparks from chimney	1	.....	20
Blacksmith-shops	8	Ashes against wood	1	$ 10	
		Barrel of oil under burner upset	1	419	
		Oil-tempering tank overheated	1	1,330	
		Smokers' carelessness	1	3,825	
		Sparks from forge	3	845	
		Unknown	1	484	
					6,913
Boarding-houses	1	Sparks from fireplace	1	.....	10
Boats	3	Gasolene carelessness	1	$ 1,100	
		Torch near overflooded oil-burner	1	100	
		Unknown	1	700	
					1,900
Boat-houses	6	Exposure	4	$ 4,040	
		Gasolene carelessness	1	4,500	
		Match carelessness	1	25	
					8,565
Boiler-houses	2	Defective chimney	1	$ 25	
		Sparks from boiler	1	698	
					723
Breweries	1	Unknown	1	.....	25
Bridges	2	Smokers' carelessness	1	$ 6	
		Sparks from friction	1	103	
					109
Bunk-houses	5	Smokers' carelessness	1	$ 5,826	
		Stove insufficiently protected	3	6,054	
		Unknown	1	9,000	
					20,880
Canneries	2	Exposure	1	$ 2,500	
		Spontaneous combustion	1	13,854	
					16,354
Car-barns	1	Spontaneous combustion	1	.....	410
Carpenter-shops	2	Exposure	1	$ 200	
		Sparks from stove	1	1,855	
					2,055
Chicken-houses	1	Stove insufficiently protected	1	.....	50
Churches	4	Matches against wood	1	$ 50	
		Defective furnace	1	11,000	
		Furnace insufficiently protected	1	9	
		Incendiary	1	5	
					11,064
Clubs	8	Exposure	2	$ 3,550	
		Smokers' carelessness	2	20	
		Sparks from chimney	1	37	
		Thawing pipes	1	10	
		Unknown	2	1,950	
					5,567

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Creameries	1	Exposure	1	$	$ 627
Derricks	1	Matches, children with	1		100
Dredges	1	Ashes thrown overboard ignited oil on water	1		400
Dry-kilns	1	Sparks from burner	1		50
Dwellings	730	Ashes against wood	8	$ 214	
		Back-draught from furnace	1	35	
		Bottle of patent stove-polish upset on stove	1	15	
		Brooder insufficiently protected	1	56	
		Candle carelessness	9	1,741	
		Child playing before fireplace with celluloid comb	1	15	
		Clothes too near stove	15	4,084	
		Coal-oil carelessness	2	141	
		Coffee-urn upset	1	452	
		Curtain from lamp	2	900	
		Defective chimney	52	60,342	
		Defective fireplace	21	5,046	
		Defective furnace-pipe	3	260	
		Defective lamp	1	40	
		Defective stove-pipe	12	8,582	
		Defective wiring	5	4,771	
		Duster from gas-jet	1	10	
		Electric appliances	25	2,511	
		Exposure	47	40,833	
		Fire-crackers	3	106	
		Furnace explosion	1	20	
		Furnace insufficiently protected	2	2,819	
		Fumigation	1	15	
		Gas explosion	2	335	
		Gasolene carelessness	3	2,295	
		Grease on stove or range	4	67	
		Incendiary	5	10,765	
		Lamp explosion	3	4,556	
		Lamp upset	8	3,991	
		Lightning	3	11,812	
		Live coals	3	137	
		Match carelessness	19	984	
		Matches, children with	16	3,702	
		Mattress against furnace	1	15	
		Mosquito-smudge	2	2,275	
		Oil-stove explosion	6	822	
		Oil-stove upset	2	106	
		Papers too close to stove	2	60	
		Pumpkin-lantern upset	1	12	
		Purse fell into fire	1	2	
		Smokers' carelessness	18	653	
		Sparks from burner	4	5,085	
		Sparks from burning rubbish	4	4,244	
		Sparks from bush fire	6	1,885	
		Sparks from chimney	235	73,662	
		Sparks from fireplace	20	357	
		Sparks from locomotive	1	30,000	
		Sparks from stove	12	5,276	
		Spontaneous combustion	2	5,125	
		Stove explosion	1	50	
		Stove insufficiently protected	42	15,969	
		Tar boiling over	2	3,110	
		Torch ignited woodwork	8	314	
		Unknown	76	99,180	
		Wood on furnace	1	135	
		Wood too near stove	2	475	
					420,464
Dye-works	2	Match carelessness	1	$ 42	
		Unknown	1	137	
					179
Engine-houses	1	Sparks from boiler	1		1,010
Factories (broom-handle)	1	Sparks from chimney	1		10
Factories (carriage)	2	Hot bearing	1	$ 542	
		Sparks from forge	1	5	
					547
Factories (fertilizer)	1	Unknown	1		3,500
Factories (fruit-packing)	3	Unknown	3		20,815
Factories (fur-cleaning)	1	Gasolene carelessness	1		4,200
Factories (mattress)	2	Friction in felting-machine	1	$ 1,150	
		Unknown	1	25	
					1,175
Factories (oil)	2	Oil-burners back-firing	1	$ 828	
		Unknown	1	11,800	
					12,628
Factories (paper-box)	1	Stove insufficiently protected	1		85
Factories (rubber-roofing)	3	Caldron for cement boiled over	1	$ 273	
		Gas escaping from still	1	300	
		Sparks from burner	1	35	
					608
Factories (sash and door)	3	Exposure	1	$ 10	
		Unknown	2	26,530	
					26,540

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Factories (soap)	1	Spontaneous combustion	1	.....	$ 50
Fences	1	Spontaneous combustion	1	.....	2
Fish-curing plants	2	Defective wiring	1	$ 2,544	
		Incendiary	1	3,601	
					6,145
Flumes	1	Sparks from bush fire	1	.....	1,059
Foundries	3	Defective oven	1	$ 75	
		Torch explosion	1	250	
		Unknown	1	360	
					685
Gaols	1	Unknown	1	.....	4,300
Garages	13	Furnace insufficiently protected	1	$ 50	
		Gasolene carelessness	3	670	
		Incendiary	1	1,125	
		Short circuit	1	850	
		Smokers' carelessness	1	100	
		Spontaneous combustion	2	115	
		Static electricity	1	250	
		Torch explosion	1	30	
		Unknown	2	1,190	
					4,380
Gas-works	1	Spontaneous combustion	1	.....	100
Halls	2	Defective stove-pipe	1	$ 1,300	
		Stove insufficiently protected	1	35	
					1,335
Haystacks	1	Smokers' carelessness	1	.....	3,178
Hospitals	13	Defective chimney	1	$ 1,350	
		Match carelessness	1	321	
		Short circuit	1	46	
		Smokers' carelessness	1	115	
		Sparks from burning rubbish	1	65	
		Sparks from chimney	6	11,028	
		Sparks from furnace	1	15	
		Unknown	1	30,000	
					42,940
Hotels	32	Defective chimney	2	$ 650	
		Electric appliances	1	24	
		Exposure	3	12,138	
		Lamp explosion	1	25	
		Matches, children with	1	421	
		Mattress too near chimney	1	3,700	
		Oil-stove explosion	1	132	
		Smokers' carelessness	9	528	
		Sparks from chimney	5	8,268	
		Stove insufficiently protected	1	200	
		Unknown	7	43,849	
					69,935
Laundries	14	Clothes too near stove	1	$ 325	
		Defective chimney	1	1,100	
		Defective stove-pipe	1	25	
		Electric appliances	1	7,000	
		Exposure	1	140	
		Fire built by workmen on concrete floor set fire to joists	1	50	
		Incendiary	1	14	
		Sparks from chimney	1	325	
		Spontaneous combustion	1	3,500	
		Stove insufficiently protected	3	1,240	
		Unknown	2	2,650	
					16,174
Logs	1	Sparks from bush fire	1	.....	3,000
Lumber-mills	7	Defective wiring	1	$ 689	
		Exposure	1	2,100	
		Incendiary	1	3,117	
		Sparks from bush fire	1	1,500	
		Sparks from locomotive	1	9,154	
		Spontaneous combustion	1	11,000	
		Unknown	1	246,235	
					273,795
Machine-shops	1	Unknown		.....	2,000
Mess-houses	5	Sparks from bush fire	1	$ 1,400	
		Sparks from chimney	1	14	
		Unknown	3	8,907	
					10,321
Metal-works	2	Spontaneous combustion	1	$ 698	
		Unknown	1	56,849	
					57,547

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Mining property	9	Candle carelessness	1	$ 3,118	
		Converter-flue insufficiently protected	1	7,450	
		Defective wiring	1	3,990	
		Sparks from bush fire	2	5,516	
		Spontaneous combustion	2	1,005	
		Unknown	2	41,510	
					$ 62,589
Motor-cycles	3	Carburettor back-firing	2	$ 85	
		Gasolene carelessness	1	10	
					95
Motor-trucks	3	Carburettor back-firing	1	$ 125	
		Short circuit	2	365	
					490
Offices	9	Defective fireplace	1	$ 5	
		Match carelessness	1	8	
		Papers too close to stove	1	150	
		Short circuit	1	40	
		Smokers' carelessness	2	19	
		Spontaneous combustion	1	375	
		Unknown	2	4,730	
					5,327
Pile-drivers	2	Sparks from boiler	2	.....	6,010
Planing-mills	1	Unknown	1	.....	27,000
Poles	9	Defective wiring	1	$ 25	
		Exposure	1	65	
		Short circuit	6	175	
		Sparks from bush fire	1	9,035	
					9,300
Power-houses	1	Unknown	1	.....	5,123
Printing-offices	2	Defective stove or stove-pipes	2	.....	106
Railway-cars	1	Stove insufficiently protected	1	.....	800
Restaurants	5	Defective chimney	1	$ 20	
		Defective stove	1	6,675	
		Sparks from furnace	1	7,315	
		Spontaneous combustion	1	15	
		Stove insufficiently protected	1	23	
					14,048
Rooming-houses	16	Curtain from stove	1	$ 10	
		Electric appliances	1	75	
		Exposure	1	900	
		Match carelessness	1	62	
		Smokers' carelessness	4	1,517	
		Sparks from chimney	6	352	
		Stove-pipe insufficiently protected	1	4,753	
		Unknown	1	1,500	
					9,169
Sawmills	14	Defective stove-pipe	1	$ 4,098	
		Exposure	2	3,115	
		Hot bearing	1	40,989	
		Smokers' carelessness	1	63	
		Sparks from burner	3	55,887	
		Sparks from burning rubbish	1	8,000	
		Sparks from bush fire	1	2,500	
		Sparks from boiler	1	55,000	
		Sparks from furnace	1	100	
		Unknown	2	11,232	
					180,984
Schools	7	Defective chimney	2	$ 3,100	
		Incendiary	1	840	
		Phosphorus in cupboard	1	35	
		Screen too close to stove	1	10	
		Sparks from chimney	2	299	
					4,284
Section-houses	1	Incendiary	1	.....	700
Sheds	15	Ashes against wood	4	$ 182	
		Exposure	2	770	
		Incendiary	1	75	
		Oil-stove explosion	1	600	
		Smokers' carelessness	1	10	
		Sparks from bush fire	1	5	
		Sparks from chimney	2	10	
		Sparks from tractor	1	550	
		Unknown	2	216	
					2,418
Shingle-mills	14	Incendiary	1	$ 2,000	
		Sparks from boiler	3	5,448	
		Sparks from burner	1	350	
		Sparks from furnace	2	27,352	
		Sparks from locomotive	1	642	
		Spontaneous combustion	1	1,000	
		Unknown	5	122,350	
					159,142

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Ship-Chandleries	1	Spontaneous combustion	1	$	5
Slaughter-houses	1	Unknown	1		8,000
Stables	7	Matches, children with	1	$ 600	
		Short circuit	1	10,700	
		Sparks from chimney	1	5	
		Sparks from locomotive	1	6,250	
		Spontaneous combustion	1	1,513	
		Unknown	2	276	
					19,344
Steel-works	1	Short circuit	1		1,540
Stores	76	Bottle of alcohol exploding	1	$ 46	
		Children playing with lighted paper	1	50	
		Defective chimney	3	2,660	
		Defective furnace	1	15	
		Defective stove-pipe	1	13,651	
		Defective wiring	1	34	
		Electric appliances	1	18	
		Exposure	17	8,903	
		Fire-crackers	1	10	
		Gasolene carelessness	1	200	
		Grease on range	1	67	
		Incendiary	3	16,703	
		Lamp upset	1	10	
		Lightning	2	31	
		Match carelessness	4	18,038	
		Matches, children with	1	25	
		Oil-stove explosion	2	80	
		Short circuit	1	85	
		Smokers' carelessness	9	3,163	
		Sparks from bush fire	1	1,897	
		Sparks from chimney	7	2,369	
		Spontaneous combustion	3	11,404	
		Stove insufficiently protected	4	6,966	
		Tar boiling over	1	23	
		Unknown	7	39,555	
		Wood too near stove	1	776	
					126,779
Stores and dwellings over	11	Clothes too near stove	1	$ 10	
		Defective chimney	2	15,069	
		Drying wood in stove	1	2,200	
		Exposure	2	11,517	
		Smokers' carelessness	2	120	
		Sparks from chimney	1	5	
		Unknown	2	8,335	
					37,256
Stores and offices over	6	Exposure	1	$ 3,500	
		Incendiary	1	1,242	
		Smokers' carelessness	1	25	
		Unknown	1	2,550	
					5,317
Stores and rooms over	17	Ashes against wood	1	$ 37	
		Defective chimney	2	138	
		Electric appliances	1	118	
		Smokers' carelessness	4	142	
		Sparks from chimney	4	2,058	
		Spontaneous combustion	1	17,096	
		Stove-pipe insufficiently protected	2	1,285	
		Unknown	2	3,027	
					23,901
Street-cars	7	Overresistances	1	$ 15	
		Short circuit	5	73	
		Trolly-wire	1	30	
					118
Tents	2	Candle carelessness	1	$ 25	
		Sparks from bush fire	1	125	
					150
Theatres (moving-picture)	1	Unknown	1		3,500
Transformers	2	Exposure	1	$ 150	
		Short circuit	1	25	
					175
Undertaking-parlors	1	Defective furnace	1		80
Vulcanizing plant	1	Sparks from chimney	1		18
Warehouses	14	Ashes against wood	1	$ 82,832	
		Clothes too near stove	1	824	
		Exposure	2	610	
		Matches, children with	1	250	
		Smokers' carelessness	1	10	
		Sparks from burner	1	1,241	
		Sparks from burning rubbish	1	18	
		Sparks from stove	1	8,000	
		Unknown	5	2,516	
					96,301

TABLE VII.—CLASSIFICATION OF PROPERTY BURNED AND CAUSES—*Continued.*

Property.		Causes.		Amount of Loss.	
Watch-houses	1	Sparks from chimney	1	.....	$ 10
Water-towers	1	Defective stove-pipe	1	.....	2,000
Wharves	4	Motor setting fire to ceiling	1	$ 10	
		Sparks from chimney	1	500	
		Spontaneous combustion	1	50	
		Stove insufficiently protected	1	70	
				.....	630
Wood	1	Unknown	1	.....	35
				.....	
Totals	1,221		1,221	.....	$1,927,892

TABLE VIII.—SUMMARY.

	Fires Reported.				Amount of Loss.			
	Cities (35).	Other Municipalities (28).	Insurance Districts (15).	Total.	Cities (35).	Other Municipalities (28).	Insurance Districts (15).	Total.
1919.								
January	57	11	7	75	$ 131,550	$ 4,318	$ 8,556	$ 144,424
February	48	8	7	63	23,871	11,316	7,463	42,650
March	63	13	14	90	95,525	8,798	34,406	138,729
April	58	14	9	81	35,524	35,063	16,433	87,020
May	113	27	21	161	62,323	20,480	38,147	120,950
June	80	32	15	127	51,967	39,656	77,131	168,754
July	87	18	14	119	71,318	44,836	38,595	154,749
August	60	14	15	89	33,477	18,406	36,707	88,590
September	65	27	18	110	77,028	195,481	101,084	373,593
October	66	8	9	83	284,218	3,960	14,204	302,382
November	52	12	8	72	37,601	7,865	53,242	98,708
December	104	20	27	151	109,488	23,087	74,768	207,343
Totals, 1919..	853	204	164	1,221	$1,013,890	$ 413,266	$ 500,736	$1,927,892
Totals, 1918..	619	220	105	944	800,668	863,306	431,252	2,095,226
Totals, 1917..	422	123	117	662	756,427	227,442	558,009	1,541,878
Totals, 1916..	496	172	...	668	1,041,440	339,512	.....	1,380,952
Totals, 1915..	469	240	...	709	865,093	365,717	.....	1,230,810
Grand totals..	2,859	959	386	4,204	$4,477,518	$2,209,243	$1,489,997	$8,176,758

TABLE IX.—LOSS OF LIFE, 1916-19.

Occupancy.	Cause of Fire.	Loss of Life.	
		Adults.	Children.
Dwelling	Defective chimney	..	1
Dwelling	Mosquito-smudge upset	..	2
Dwelling	Unknown	1	2
Store and Rooms	Spontaneous combustion	1	..
Totals		2	5
Totals, 1918		4	..
Totals, 1917		8	1
Totals, 1916		6	9

TABLE X.—INVESTMENTS IN BRITISH COLUMBIA OF COMPANIES OTHER THAN LIFE INSURANCE COMPANIES.

(For British Columbia investments of Life Insurance Companies *see* Abstract of Returns of Life Insurance Companies, *post.*)

Name of Company.	Mortgages.	In other Securities.
American Central Insurance Co.	.....	$ 30,660 00*
Boiler Inspection & Insurance Co. of Canada	.....	44,000 00*
Boston Insurance Co.	.....	23,750 00
British America Assurance Co.	.....	160,866 66*
British Columbia Plate Glass Insurance Co.	.....	5,973 33
British Colonial Fire Insurance Co.	.....	3,000 00
British Crown Assurance Corporation, Ltd.	.....	25,219 86*
British Northwestern Fire Insurance Co.	$ 10,248 00	.....
Caledonian Insurance Co., Ltd.	1,056,716 33	154,869 38
California Insurance Co.	.....	21,200 00†
Canada Accident and Fire Assurance Co.	.....	19,000 00
Canada National Fire Insurance Co.	70,070 91	.....
Canadian Surety Co.	.....	25,733 33*
Century Insurance Co., Ltd.	.....	16,000 00*
Commercial Union Assurance Co., Ltd.	391,035 12	.....
Dominion Fire Insurance Co.	13,500 00	80,353 33
Dominion of Canada Guarantee and Accident Insurance Co.	.....	103,911 50*
General Accident Assurance Co. of Canada	.....	32,998 16*
General Accident Fire & Life Assurance Co., Ltd.	.....	44,137 54*
Glens Falls Insurance Co.	.....	19,000 00
Globe & Rutgers Fire Insurance Co.	.....	48,180 00*
Globe Indemnity Co. of Canada	.....	5,000 00
Guardian Insurance Co. of Canada	.....	39,333 33
Hartford Fire Insurance Co.	.....	76,000 00*
Home Insurance Co.	.....	50,000 00*
Hudson Bay Insurance Co.	28,503 60	116,250 00
Imperial Guarantee & Accident Insurance Co.	.....	29,676 50‡
Imperial Underwriters Corporation of Canada	94,366 00	30,434 75‡
Insurance Co. of the State of Pennsylvania	.....	53,200 00*
Law Union & Rock Insurance Co., Ltd.	415,704 00	.....
Liverpool-Manitoba Assurance Co.	.....	30,000 00*
London & Scottish Assurance Corporation, Ltd.	.....	154,480 50
London Assurance Corporation	9,700 00	35,200 00
London Mutual Fire Insurance Co. of Canada	.....	42,519 23
Loyal Protective Insurance Co.	.....	100,000 00
Maritime Insurance Co., Ltd.	.....	37,500 00
Maryland Casualty Co.	.....	62,719 65
National Ben Franklin Fire Insurance Co.	.....	35,220 00
National Fire Insurance Co. of Hartford	.....	22,984 75
National Union Fire Insurance Co.	.....	35,000 00*
North American Accident Insurance Co.	.....	4,937 50‡
North British & Mercantile Insurance Co.	389,500 00	147,000 00*
North Empire Fire Insurance Co.	.....	45,000 00
Northern Assurance Co., Ltd.	.....	250,000 00
Northwestern National Insurance Co.	.....	43,060 27†
Norwich Union Fire Insurance Society, Ltd.	.....	75,200 00
Pacific Coast Fire Insurance Co.	123,003 58	629,213 92
Phoenix Insurance Co.	.....	18,600 00
Queen Insurance Co. of America	.....	32,000 00*
Royal Insurance Co., Ltd.	280,000 00	214,850 67*
Royal Plate Glass Insurance Co. of Canada	2,250 00	.....
Springfield Fire & Marine Insurance Co.	.....	37,650 00†
Union Marine Insurance Co., Ltd.	.....	22,212 92
The Yorkshire Insurance Co., Ltd.	16,922 29	.....
Totals	$2,901,519 83	$3,334,097 08

* Par value. † Market value. ‡Book value.

TABLE XI.—ABSTRACT OF THE RETURNS OF LIFE INSURANCE COMPANIES TRANSACTING BUSINESS IN THE PROVINCE OF BRITISH COLUMBIA, 1919.

Name of Company.	Premiums for the Year.	Number of Policies, new and taken up.	Amount of Policies new and taken up.	Number of Policies in Force at Date.	Net Amount in Force.	Number of Policies become Claims.	Net Amount of Policies become Claims.	Claims paid including Matured Endowments.	Unsettled Claims.		Amount invested in British Columbia.	
									Not resisted.	Resisted.	On Mortgages.	On other Securities.
1. Aetna Life Insurance Co	$ 9,892 92	12	$ 113,026 00	265	$ 589,932 81	.....	$ 4,089 00	$ 4,000 00	$ 89 00	*Nil.*	*Nil.*	* $616,366 66
2. Canada Life Assurance Co	265,553 37	742	1,631,606 00	3,313	7,977,125 00	33	106,703 00	145,255 00	7,385 00	*Nil.*	$ 544,847 00	* 1,696,560 81
3. Capital Life Assurance Co	1,695 12	3	10,000 00	20	50,000 00	.....	*Nil.*	*Nil.*	*Nil.*	*Nil.*	*Nil.*	* 45,836 31
4. Confederation Life Association	235,071 13	1,056	2,242,727 00	3,698	7,688,202 00	.....	110,044 00	134,215 00	16,329 00	*Nil.*	1,098,569 22	* 495,745 26
5. Continental Life Insurance Co	44,074 33	227	333,525 00	783	1,259,162 00	5	8,000 00	11,000 00	1,000 00	$ 2,000	3,000 00	† 205,961 98
6. Crown Life Insurance Co	95,644 28	.....	717,249 00	.....	3,331,081 00	.....	26,000 00	36,000 00	1,000 00	*Nil.*	20,125 00	† 136,748 73
7. Dominion Life Assurance Co	39,473 55	362	726,067 00	.....	1,278,332 00	5	8,050 00	6,150 00	5,050 00	*Nil.*	76,950 00	* 62,053 17
8. Equitable Life Assurance Society	76,374 88	135	268,597 00	1,098	2,391,475 00	.....	53,572 60	59,588 91	2,983 69	*Nil.*	364,000 00	* 330,820 00
9. Excelsior Life Insurance Co	73,665 78	.....	741,500 00	.....	2,116,965 00	4	8,745 00	8,913 00	5,000 00	2,000	*Nil.*	† 5,000 00
10. Great West Life Assurance Co	531,586 76	.....	4,406,268 00	.....	16,635,351 00	.....	92,292 95	168,664 40	5,524 55	10,000	429,054 96	* 99,287 52
11. Imperial Life Assurance Co	223,450 76	906	1,793,870 00	3,184	6,307,286 00	.....	69,366 00	81,714 60	14,198 00	*Nil.*	111,654 51	* 388,455 49
12. London Life Insurance Co	62,421 04	552	866,607 00	1,213	1,795,888 50	12	12,317 88	13,252 88	1,065 00	*Nil.*	*Nil.*	† 672,994 56
13. London & Scottish Assurance Corporation, Ltd	37,279 20	39	73,500 00	.....	1,166,720 00	16	36,982 75	46,157 75	1,000 00	*Nil.*	*Nil.*	* 154,480 50
14. Manufacturers Life Insurance Co	111,187 82	408	885,085 00	1,309	2,501,907 00	12	16,562 10	20,733 10	2,000 00	*Nil.*	3,950 00	† 454,329 76
15. Metropolitan Life Insurance Co { Ordinary	293,156 91	3,718	3,880,000 00	10,094	9,340,000 00	80	85,661 54	93,788 54	2,500 00	*Nil.*	.....	.....
{ Industrial	254,627 50	13,526	2,050,000 00	52,512	6,760,000 00	490	48,622 95	49,316 95	389 00	.....	2,290 00	† 1,093,420 38
16. Monarch Life Assurance Co	149,654 24	.....	1,444,914 00	.....	5,045,581 00	.....	32,134 37	54,573 50	6,000 00	*Nil.*	18,130 60	* 32,483 46
17. Mutual Life Assurance Co. of Canada	390,314 78	1,610	2,958,975 00	6,330	11,748,318 00	60	84,432 00	123,529 00	18,500 00	*Nil.*	503,677 56	* 521,888 06
18. Mutual Life Insurance Co. of N.Y	93,703 93	204	495,376 76	1,715	3,388,668 00	33	74,495 00	81,497 00	16,654 00	*Nil.*	*Nil.*	*Nil.*
19. National Life Assurance Co. of Canada	55,171 87	181	560,384 00	.....	1,530,915 00	.....	37,276 80	32,113 40	5,163 40	.....	*Nil.*	*Nil.*
20. New York Life Insurance Co	407,775 57	926	2,122,482 00	5,448	11,520,824 00	88	143,706 86	193,444 41	30,412 45	*Nil.*	1,008,500 00	* 100,000 00
21. North American Life Assurance Co	264,370 96	1,017	2,112,984 00	3,510	6,863,873 00	.....	65,403 30	80,962 42	13,707 03	*Nil.*	592,870 80	† 815,787 68
22. Northern Life Assurance Co	19,671 55	.....	366,008 00	323	732,117 00	8	11,500 00	9,500 00	2,000 00	*Nil.*	5,000 00	* 119,116 38
23. Norwich Union Life Insurance Society	187 59	.....	.....	.....	3,000 00	.....	.....	.....	.....	.....	95,500 00	* 33,846 67
24. Phoenix Assurance Co., Ltd	12,426 17	17	40,000 00	171	455,738 00	1	1,385 00	6,885 00	*Nil.*	*Nil.*	*Nil.*	* 38,500 00
25. Prudential Insurance Co. of America { Ordinary	136,228 76	1,387	1,671,718 00	4,280	4,810,559 00	37	38,595 55	45,146 55	3,000 00	*Nil.*	.....	.....
{ Industrial	183,268 16	7,504	1,305,144 00	29,138	4,498,957 00	224	36,378 04	37,339 81	1,292 07	195	*Nil.*	‡ 344,014 60
26. Royal Insurance Co., Ltd	84,691 06	156	502,574 00	950	2,724,756 67	8	13,991 60	23,791 60	7,605 00	*Nil.*	*Nil.*	‡ 29,459 44
27. Sovereign Life Assurance Co	43,144 61	108	275,000 00	479	1,045,887 00	4	5,500 00	5,500 00	2,000 00	*Nil.*	*Nil.*	* 32,500 00
28. Standard Life Assurance Co.**	31,852 65	43	105,500 00	424	1,011,419 28	10	23,277 10	27,313 31	3,511 68	*Nil.*	299,000 00	167,884 34
29. Sun Life Assurance Co. of Canada	462,285 96	1,810	2,997,098 00	6,757	12,128,308 00	.....	158,426 59	226,619 32	27,800 00	*Nil.*	906,245 45	* 2,872,642 36
30. Travelers Insurance Co	28,654 18	169	762,841 00	328	1,363,755 00	.....	1,360 00	1,360 00	*Nil.*	*Nil.*	*Nil.*	‖ 514,905 27
31. Travellers Life Assurance Co. of Canada	3,188 97	3	13,000 00	41	102,680 00	1	1,000 00	*Nil.*	1,000 00	*Nil.*	*Nil.*	* 9,522 19
32. Union Mutual Life Insurance Co	19,012 84	45	110,500 00	299	576,600 00	7	13,400 65	17,173 70	1,226 95	*Nil.*	*Nil.*	* 129,966 67
33. Western Empire Life Assurance Co	7,432 64	115	181,650 00	186	309,650 00	.....	4,674 75	2,174 75	2,500 00	*Nil.*	13,000 00	* 15,319 60
34. Western Life Assurance Co	18,521 42	.....	148,750 00	.....	499,025 00	.....	1,000 00	3,000 00	2,000 00	*Nil.*	*Nil.*	* 6,228 94
	$4,766,713 26	.....	$38,908,525 76	.....	$141,549,458 26	.....	$1,434,947 38	$1,850,673 90	$209,885 82	$14,195	$6,096,365 10	$ 12,242,126 79

* Basis of valuation not stated. † Book value. ‡ Including loans on policies. ‖ Cost value. ** Year ended November 15th, 1920.

TABLE XII.—LIFE INSURANCE SUMMARY.

	1915.	1916.	1917.	1918.	1919.
Premiums for year	$ 2,761,000	$ 2,906,000	$ 3,313,000	$ 4,026,000	$ 4,766,713
Net amount in force	83,204,000	87,983,000	95,309,000	112,978,000	141,549,458
Claims paid	1,021,000	1,034,000	1,302,000	1,558,000	1,850,673

TABLE XIV.—MISCELLANEOUS INSURANCE SUMMARY.

	1915.	1916.	1917.	1918.	1919.
Accident, P.	$139,000	$126,000	$197,000	$221,000	$249,000
" L.	62,000	47,000	111,000	78,000	113,000
Sickness, P.	68,000	100,000	50,000	73,000	106,000
" L.	32,000	43,000	21,000	41,000	65,000
Liability, P.	279,000	282,000	68,000	31,000	42,000
" L.	155,000	191,000	103,000	14,000	34,000
Automobile, P.	57,000	93,000	135,000	230,000	423,000
" L.	33,000	28,000	50,000	65,000	142,000
Marine, P.	130,000	200,000	283,000	404,000	472,000
" L.	68,000	120,000	152,000	125,000	210,000
Other forms, P.	73,000	69,000	74,000	79,000	134,000
" L.	26,000	28,000	22,000	21,000	35,000

P.—Premiums. L.—Losses.

	Marine.		Live Stock, Steam-boiler, Sprinkler Leakage, Inland Transportation and Explosion. (Indicated by Initial letters.)		Total Premiums.	Total Losses.	Unsettled Claims.	
	Premiums.	Losses.	Premiums.	Losses.				
1	$ 44,107 93	$ 25,389 56	.....	....	$ 48,477 34	$ 26,138 39	$ 10,824 28	1
2	7,380 60	187 70	.....	.....	12,399 54	709 88	*Nil.*	2
3	6,674 70	975 27	I.T. $ 62 50	*Nil.*	6,921 50	975 27	*Nil.*	3
4	.....	.....	.....	.....	212 87	*Nil.*	*Nil.*	4
5	.....	.....	S.B. 1,152 66	*Nil.*	1,152 66	*Nil.*	*Nil.*	5
6	11,622 34	1,251 00	.....	.....	11,622 34	1,251 00	*Nil.*	6
7	8,066 27	361 65	.....	.....	8,066 27	361 65	....	7
8	....	.....	....	.....	8,003 18	3,057 42	530 00	8
9	25	.....	.....	.....	17,968 56	8,302 25	*Nil.*	9
10	.....	.....	.....	.....	25,508 08	12,948 64	3,404 23	10
11	9,306 12	3,191 57	.....	.....	10,189 65	3,213 62	*Nil.*	11
12	91	.....	.....	.....	31,324 35	14,711 14	8,860 00	12
13	.....	.....	.....	.....	104 50	*Nil.*	*Nil.*	13
14	.....	.....	.....	.....	6,512 48	818 90	125 00	14
15	39,266 59	2,950 02	.....	.....	39,266 59	2,950 02	10,000 00	15
16	.....	.....	.....	.....	1,859 76	20 01	*Nil.*	16
17	.....	.....	.....	.....	67,284 11	33,589 72	6,690 76	17
18	....	.....	E. 302 42	*Nil.*	302 42	*Nil.*	*Nil.*	18
19	30	.....	.....	.....	80,241 66	27,445 07	*Nil.*	19
20	.....	.....	I.T. 100 00	$ 2 32	23,025 35	4,519 30	1,167 00	20
21	24,284 05	16,309 53	.....	.....	24,284 05	16,309 53	8,375 94	21
22	.....	.....	.....	.....	42,642 99	18,108 07	3,147 00	22
23	.....	.....	.....	.....	133 81	8 32	*Nil.*	23
24	29	....	S.B. 3,071 20	*Nil.*	10,631 80	1,276 28	*Nil.*	24
25	.....	.....	E. 468 24	*Nil.*	468 24	*Nil.*	*Nil.*	25
26	48,934 41	22,857 26	.....	.....	56,407 75	24,482 71	1,603 60	26
27	535 21	126 19	.....	.....	535 21	126 19	*Nil.*	27
28	.....	.....	S.B. 449 30	*Nil.*	17,427 06	17,051 58	1,080 00	28
29	.....	.....	.....	.....	3,010 08	636 80	546 12	29
30	.....	....	L.S. 771 85	240 00	771 85	240 00	*Nil.*	30
31	.....	.....	E. 861 26	*Nil.*	1,406 71	191 49	50 00	31
32	.....	.....	.....	.....	39,642 44	35,423 95	5,942 92	32
33	11,981 50	10,098 19	E. 12,478 28	*Nil.*	24,459 78	10,098 19	1,521 67	33
34	23,727 70	5,916 79	.....	.....	51,874 66	14,477 55	2,430 00	34
35	....	.....	L.S. 936 50	*Nil.*	936 50	*Nil.*	*Nil.*	35
36	.....	.....	.....	.....	5,132 38	*Nil.*	*Nil.*	36
37	66	.....	.....	.....	7,678 88	6,433 43	1,422 30	37
38	4,127 49	1,012 31	S.L. 575 00 E. 2,418 11	*Nil.* *Nil.*	7,120 60	1,012 31	*Nil.*	38
39	.....	.....	E. 6,643 98	*Nil.*	10,041 90	1,431 96	*Nil.*	39
40	60	.....	.....	.....	21,995 82	23,066 77	2,760 00	40
41	37,085 62	17,585 01	I.T. 167 50	23 25	62,741 27	25,922 92	2,870 00	41
42	.....	.....	.....	.....	5,996 00	1,159 43	1,985 71	42
43	80	.....	.....	.....	2,568 62	1,099 80	100 00	43
44	7,611 06	2,173 38	.....	.....	9,294 92	2,173 38	.....	44
45	.....	.....	.....	.....	57,918 95	26,183 95	29,920 00	45
46	49	.....	.....	.....	39,647 55	14,035 81	3,042 00	46
47	3,138 33	331 11	.....	.....	3,138 33	331 11	.....	47
48	.....	.....	.....	.....	3,562 00	1,960 01	336 00	48
49	.....	.....	.....	.....	1,600 24	*Nil.*	*Nil.*	49
50	182 57	*Nil.*	.....	.....	182 57	*Nil.*	*Nil.*	50
51	....	.....	.....	.....	3,113 30	1,745 03	225 85	51
52	.....	.....	S.L. 448 50 S.B. 109 31	*Nil.* *Nil.*	7,751 67	1,175 75	900 00	52
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NAME OF COMPANY.	Accident.		Sickness.		Liability.		Automobile.		Burglary.		Guarantee.		Plate Glass.		Marine.		Live Stock, Steam-boiler, Sprinkler Leakage, Inland Transportation and Explosion. (Indicated by Initial letters.)		Total Premiums.	Total Losses.	Unsettled Claims.	
	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.	Premiums.	Losses.				
1. Aetna Insurance Co.							$ 4,369 41	$ 748 83							$ 44,107 93	$ 25,389 56			$ 48,477 34	$ 26,138 39	$ 10,824 28	1
2. Alliance Assurance Co., Ltd.	$ 201 75	*Nil.*	$ 68 50	$ 119 60	$ 494 55	*Nil.*	4,022 59	402 58			$ 231 55	*Nil.*			7,380 60	187 70			12,399 54	709 88	*Nil.*	2
3. Alliance Insurance Co. of Philadelphia							184 30	*Nil.*							6,674 70	975 27	I.T. $ 62 50	*Nil.*	6,921 50	975 27	*Nil.*	3
4. American Alliance Insurance Co.							212 87	*Nil.*											212 87	*Nil.*	*Nil.*	4
5. Boiler Inspection & Insurance Co. of Canada																	S.B. 1,152 66	*Nil.*	1,152 66	*Nil.*	*Nil.*	5
6. Boston Insurance Co.															11,622 34	1,251 00			11,622 34	1,251 00	*Nil.*	6
7. British & Foreign Marine Insurance Co.†															8,066 27	361 65			8,066 27	361 65		7
8. British America Assurance Co.							8,003 18	3,057 42											8,003 18	3,057 42	530 00	8
9. British Columbia Plate Glass Insurance Co.													$ 17,968 56	$ 8,302 25					17,968 56	8,302 25	*Nil.*	9
10. British Crown Assurance Corporation, Ltd.							25,508 08	12,948 64											25,508 08	12,948 64	3,404 23	10
11. British Traders Insurance Co., Ltd.							883 53	22 05							9,306 12	3,191 57			10,189 65	3,213 62	*Nil.*	11
12. Canada Accident & Fire Assurance Co.	4,599 12	$ 964 07	3,046 11	3,047 68	11,964 84	$ 5,226 97	10,254 59	4,231 89	$ 145 44	$ 419 37	250 02	$ 36 25	1,064 23	784 91					31,324 35	14,711 14	8,860 00	12
13. Canadian Fire Insurance Co.							104 50	*Nil.*											104 50	*Nil.*	*Nil.*	13
14. Canadian Surety Co.							857 31	818 90	188 54	*Nil.*	5,466 63	*Nil.*							6,512 48	818 90	125 00	14
15. Canton Insurance Office, Ltd.															39,266 59	2,950 02			39,266 59	2,950 02	10,000 00	15
16. Car & General Insurance Corporation, Ltd.							1,859 76	20 01											1,859 76	20 01	*Nil.*	16
17. Continental Casualty Co.	37,974 87	16,457 56	19,434 68	15,803 41	521 74	*Nil.*	9,352 82	1,328 75											67,284 11	33,589 72	6,690 76	17
18. Continental Insurance Co.																	E. 302 42	*Nil.*	302 42	*Nil.*	*Nil.*	18
19. Dominion of Canada Guarantee & Accident Insurance Co.	35,476 54	7,382 35	18,894 14	7,417 71			22,331 94	9,082 52	150 06	*Nil.*	2,097 88	2,813 19	1,291 10	749 30					80,241 66	27,445 07	*Nil.*	19
20. Dominion Gresham Guarantee & Casualty Co.	4,982 20	864 95	6,599 59	2,107 43	157 45	*Nil.*	10,882 55	1,544 60	56 89	*Nil.*	246 67	*Nil.*					I.T. 100 00	$ 2 32	23,025 35	4,519 30	1,167 00	20
21. Eagle Star & British Dominions Insurance Co., Ltd.															24,284 05	16,309 53			24,284 05	16,309 53	8,375 94	21
22. Employers Liability Assurance Corporation, Ltd.	8,090 84	1,398 05	4,615 76	1,679 75	3,379 68	2,137 44	23,800 81	9,866 23	415 63	*Nil.*	2,340 27	3,026 60							42,642 99	18,108 07	3,147 00	22
23. Equitable Fire & Marine Insurance Co.							133 81	8 32											133 81	8 32	*Nil.*	23
24. Fidelity & Casualty Company	759 37	312 50	779 63	466 42	2,029 09	−276 03	2,017 40	115 10	1,339 09	19 00			636 02	639 29			S.B. 3,071 20	*Nil.*	10,631 80	1,276 28	*Nil.*	24
25. Fidelity Phenix Fire Insurance Co.																	E. 468 24	*Nil.*	468 24	*Nil.*	*Nil.*	25
26. Fireman's Fund Insurance Co.							7,473 34	1,625 45							48,934 41	22,857 26			56,407 75	24,482 71	1,603 60	26
27. Firemen's Insurance Co. of Newark															535 21	126 19			535 21	126 19	*Nil.*	27
28. General Accident Assurance Co. of Canada	2,639 76	386 41	1,110 40	561 42	4,167 87	12,486 45	7,831 61	3,617 30			1,228 12	*Nil.*					S.B. 449 30	*Nil.*	17,427 06	17,051 58	1,080 00	28
29. General Accident Fire & Life Assurance Corporation, Ltd.							3,010 08	636 80											3,010 08	636 80	546 12	29
30. General Animals Insurance Co. of Canada																	L.S. 771 85	240 00	771 85	240 00	*Nil.*	30
31. Glens Falls Insurance Co.							545 45	191 49									E. 861 26	*Nil.*	1,406 71	191 49	50 00	31
32. Globe Indemnity Co. of Canada	15,167 21	20,250 04	12,282 95	10,079 43	1,858 28	505 95	9,089 16	4,591 08	124 05	*Nil.*	1,120 79	−2 55							39,642 44	35,423 95	5,942 92	32
33. Globe & Rutgers Fire Insurance Co.															11,981 50	10,098 19	E. 12,478 28	*Nil.*	24,459 78	10,098 19	1,521 67	33
34. Great American Insurance Co.							28,146 96	8,560 76							23,727 70	5,916 79			51,874 66	14,477 55	2,430 00	34
35. Great North Insurance Co.																	L.S. 936 50	*Nil.*	936 50	*Nil.*	*Nil.*	35
36. Guarantee Co. of North America											5,132 38	*Nil.*							5,132 38	*Nil.*	*Nil.*	36
37. Guardian Insurance Co. of Canada	954 81	270 86	2,443 57	1,912 01	1,089 11	197 10	2,381 73	691 35	330 14	*Nil.*	271 25	3,314 55	208 27	47 56					7,678 88	6,433 43	1,422 30	37
38. Hartford Fire Insurance Co.															4,127 49	1,012 31	S.L. 575 00 E. 2,418 11	*Nil.* *Nil.*	7,120 60	1,012 31	*Nil.*	38
39. Home Insurance Co.							3,397 92	1,431 96									E. 6,643 98	*Nil.*	10,041 90	1,431 96	*Nil.*	39
40. Imperial Guarantee & Accident Insurance Co.	8,369 26	15,247 68	4,622 13	4,278 24	82 25	*Nil.*	7,644 90	3,482 35			983 00	*Nil.*	294 28	68 50					21,995 82	23,066 77	2,760 00	40
41. Insurance Co. of North America							25,488 15	8,314 66							37,085 62	17,585 01	I.T. 167 50	23 25	62,741 27	25,922 92	2,870 00	41
42. Law Union & Rock Insurance Co., Ltd.	*1,551 00	279 98			4,445 00	879 45													5,996 00	1,159 43	1,985 71	42
43. Lloyds Plate Glass Insurance Co.													2,568 62	1,099 80					2,568 62	1,099 80	100 00	43
44. London Assurance Corporation							1,683 86	*Nil.*							7,611 06	2,173 38			9,294 92	2,173 38		44
45. London Guarantee & Accident Co., Ltd	13,026 39	11,946 57	2,319 84	612 00	4,141 24	4,289 00	31,379 95	9,336 38			7,051 53								57,918 95	26,183 95	29,920 00	45
46. London & Lancashire Guarantee & Accident Co.	4,243 74	589 33	2,465 55	1,556 40	1,511 21	1,649 01	25,300 74	8,637 88			3,567 09	*Nil.*	2,559 22	1,603 19					39,647 55	14,035 81	3,042 00	46
47. London & Provincial Marine & General Insurance Co., Ltd.															3,138 33	331 11			3,138 33	331 11		47
48. Loyal Protective Insurance Co.	*3,562 00	1,960 01																	3,562 00	1,960 01	336 00	48
49. Marine Insurance Co., Ltd.							1,600 24	*Nil.*											1,600 24	*Nil.*	*Nil.*	49
50. Maritime Insurance Co., Ltd.															182 57	*Nil.*			182 57	*Nil.*	*Nil.*	50
51. Maryland Assurance Corporation, Ltd.	1,374 42	585 00	1,738 88	1,160 03															3,113 30	1,745 03	225 85	51
52. Maryland Casualty Co.	*Nil.*	15 00			468 78	*Nil.*	3,585 54	1,160 75	295 07	*Nil.*	1,447 92	*Nil.*	1,396 55	*Nil.*			S.L. 448 50 S.B. 109 31	*Nil.* *Nil.*	7,751 67	1,175 75	900 00	52
53. Merchants Casualty Co.	*34,297 55	14,680 11																	34,297 55	14,680 11	3,380 28	53
54. National Provincial Plate Glass & General Insurance Co., Ltd.													1,562 91	1,035 18					1,562 91	1,035 18	*Nil.*	54
55. National Surety Co.											2,164 00	2,859 50							2,164 00	2,859 50	391 11	55
56. Newark Fire Insurance Co.															761 51	*Nil.*			761 51	*Nil.*	516 24	56
57. New Jersey Insurance Co.							3,372 43	134 05											3,372 43	134 05	346 90	57
58. New York Plate Glass Insurance Co.													2,290 71	2,294 32					2,290 71	2,294 32	729 22	58
59. New Zealand Insurance Co., Ltd.															1,582 27	1,000 00			1,582 27	1,000 00	*Nil.*	59
60. Niagara Fire Insurance Co.							2,619 88	2,029 70									E. 254 00		2,873 88	2,029 70	100 00	60
61. North American Accident Insurance Co.	3,211 67	417 85	599 11	178 54	566 69	50 00	1,137 95	223 35	36 00	*Nil.*			1,063 33	405 98					6,614 75	1,275 72	1,005 00	61
62. Northwestern Mutual Fire Association							133 40	*Nil.*											133 40	*Nil.*	*Nil.*	62
63. Northwestern National Insurance Co.							8,308 49	2,291 39											8,308 49	2,291 39	485 60	63
64. Norwich Union Fire Insurance Society, Ltd	11,279 25	3,232 64	8,832 55	3,644 30	549 63	4,376 94	6,339 46	1,820 23					903 69	250 22					27,904 58	13,324 33	1,890 50	64
65. Ocean Accident & Guarantee Corporation, Ltd.	10,100 91	1,073 63	4,386 60	1,956 94	2,648 09	464 51	10,089 24	1,295 88	227 00	50 00			2,672 18	919 24					30,124 02	5,760 20	7,130 00	65
66. Ocean Marine Insurance Co., Ltd.															2,237 40	331 12			2,237 40	331 12	*Nil.*	66
67. Phœnix Insurance Co. of Hartford.							26,307 56	12,355 71							6,595 52	7,339 47	E. 12 96	*Nil.*	32,916 04	19,695 18	2,113 00	67
68. Protective Association of Canada	*9,429 45	7,677 60																	9,429 45	7,677 60	*Nil.*	68
69. Queen Insurance Co. of America							10,222 83	1,718 59											10,222 83	1,718 59	575 00	69
70. Queensland Insurance Co., Ltd.															4,928 08	1,955 06			4,928 08	1,955 06	1,031 97	70
71. Railway Passengers Assurance Co	9,513 32	3,906 05	4,479 52	3,239 27	1,372 37	467 05	13,579 05	3,870 90	80 50	*Nil.*	788 23	9 20	696 79	183 08					30,509 78	11,675 55	2,545 00	71
72. Ridgely Protective Association	*2,289 77	1,753 10																	2,289 77	1,753 10	39 00	72
73. Reliance Marine Insurance Co.†															16,600 00	280 00			16,600 00	280 00		73
74. Royal Exchange Assurance	585 95	*Nil.*	415 00	469 96	−717 02	368 10	18,053 60	8,000 80											18,337 53	8,838 86	618 59	74
75. Royal Plate Glass Insurance Co. of Canada													3,421 60	2,170 79					3,421 60	2,170 79	*Nil.*	75
76. St. Paul Fire & Marine Insurance Co.							1,801 90	309 38							25,930 53	3,371 10	I.T. 99 18	*Nil.*	27,831 61	3,680 48	9,507 70	76
77. Scottish Metropolitan Assurance Corporation, Ltd.	307 25	*Nil.*			225 00	*Nil.*	1,650 12	290 00			3,607 76	*Nil.*							5,790 13	290 00	290 00	77
78. Scottish Union & National Insurance Co.							8,219 85	1,904 76											8,219 85	1,904 76	3,180 00	78
79. Standard Marine Insurance Co., Ltd.															17,730 94	19,579 26			17,730 94	19,579 26	*Nil.*	79
80. Tokio Marine & Fire Insurance Co., Ltd.															4,294 44	4,374 17			4,294 44	4,374 17	7 44	80
81. Travelers Indemnity Co.	2,865 11	456 43	6,048 99	4,417 66															3,914 10	4,874 09	*Nil.*	81
82. Travelers Insurance Co.	11,525 67	711 50																	11,525 67	711 50	*Nil.*	82
83. Union Insurance Society of Canton, Ltd.							5,125 75	579 25							27,504 87	28,606 82			32,630 62	29,186 07	*Nil.*	83
84. Union Marine Insurance Co., Ltd.							5,665 05	2,666 34							304 00	1,291 65			5,969 05	3,957 99	365 00	84
85. United States Fidelity & Guaranty Co.	1,402 45	15 00	955 50	242 50	1,624 16	1,527 50	1,776 17	616 90	2,095 14	714 00	15,693 69	515 85	1,957 35	677 78					25,504 46	4,309 53	8,000 00	85
86. United States Fire Insurance Co.							55 85	*Nil.*											55 85	*Nil.*	*Nil.*	86
87. United States Lloyds															11,484 06	4,470 29			11,484 06	4,470 29	590 10	87
88. Western Assurance Co.							15,296 84	5,982 10							37,652 10	4,703 89	I.T. 1,449 74	529 20	54,398 68	11,215 19	19,623 00	88
89. Western Casualty Company	9,522 05	732 30																	9,522 05	732 30	323 85	89
90. World Marine & General Insurance Co.															9,231 31	10,920 77			9,231 31	10,920 77	*Nil.*	90
91. Yang-tsze Insurance Association, Ltd.															17,646 73	11,434 29			17,646 73	11,434 29	1,077 15	91
92. Yorkshire Insurance Co., Ltd.	304 05	20 35	290 80	87 00	94 50	*Nil.*							356 48	112 96			L.S. 74 72	*Nil.*	1,120 55	220 31	135 00	92
Totals	$249,607 73	$113,586 92	$106,429 80	$65,037 70	$42,674 51	$34,349 44	$423,094 50	$142,563 38	$5,483 55	$1,202 37	$53,688 78	$12,572 59	$42,911 89	$21,334 35	$472,516 25	$210,374 43	$32,907 21	$794 77	$1,429,314 22	$601,815 95	$175,767 03	

* Accident and sickness.

RETURNS TO DECEMBER 31st, 1919, OF PROVINCIAL LICENSEES OTHER THAN FIRE AND MARINE INSURANCE COMPANIES.

ASSETS.

Name of Company.	Real Estate.	Mortgages.	Bonds, Stocks, and Loans.	Interest accrued.	Outstanding Premiums and Agents' Balances.	Cash in Office or on Deposit.	All other Assets.	Total.
1. British Columbia Plate Glass Insurance Co			$15,138 18	$83 73	$ 3,309 93	$ 2,503 34		$ 21,035 18
2. Great North Insurance Co		$18,000 00	37,181 17		14,314 59	15,287 20	$ 81,780 51	166,563 49
3. Royal Plate Glass Insurance Co		2,250 00	7,000 00	89 96	919 86	243 55	1,028 11	11,531 48
4. Western Empire Life Assurance Co	$15,319 60	90,980 65	182,686 20	10,839 93	67,928 93	15,989 25	113,030 00	496,774 56
Totals	$15,319 60	$111,230 65	$242,005 55	$11,013 62	$86,473 31	$34,023 34	$195,838 62	$ 695,904 71

LIABILITIES.

Name of Company.	Unpaid Losses.	Unearned Premiums.	Other Reserves.	Other Liabilities.	Total except Paid-up Capital.	Capital Stock paid-up.	Total including Paid-up Capital.
1. British Columbia Plate Glass Insurance Co		$ 16,088 79			$ 16,088 79	$ 3,840 00	$ 19,928 79
2. Great North Insurance Co	$20,802 74	42,183 60		$46,085 66	109,072 00	103,443 51	212,515 51
3. Royal Plate Glass Insurance Co	842 94	2,968 74		52 67	3,864 35	2,750 00	6,614 35
4. Western Empire Life Assurance Co	10,893 88	251,887 00		49,317 88	312,098 76	153,689 20	465,787 96
Totals	$32,539 56	$313,128 13		$95,456 21	$441,123 90	$263,722 71	$704,846 61

RECEIPTS.

Name of Company.	Premiums.	Interest.	Calls on Capital Stock.	All other Receipts.	Total.
1. British Columbia Plate Glass Insurance Co	$ 17,968 56	$ 759 80		$ 659 42	$ 19,387 78
2. Great North Insurance Co	182,915 78	3,877 61	$12,356 50		199,149 89
3. Royal Plate Glass Insurance Co	2,310 35	539 87			2,850 22
4. Western Empire Life Assurance Co	115,723 92	21,176 03	26,911 80	22,802 82	186,614 57
Totals	$318,918 61	$26,353 31	$39,268 30	$23,462 24	$408,002 46

EXPENDITURES.

Name of Company.	Expenses of Management.	Losses paid.	Dividends.	All other Expenditure.	Total.
1. British Columbia Plate Glass Insurance Co	$ 7,234 11	$ 8,302 25	$ 960 00		$ 16,496 36
2. Great North Insurance Co	96,386 89	178,745 12	1,399 41		276,531 42
3. Royal Plate Glass Insurauce Co	960 78	1,565 42		$ 335 00	2,861 20
4. Western Empire Life Assurance Co	78,520 22	37,420 85	290 40	2,181 30	118,412 77
Totals	$183,102 00	$226,033 64	$2,649 81	$2,516 30	$414,301 75

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VICTORIA, B.C.:
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1920.

ANNUAL REPORT

OF THE

MENTAL HOSPITALS

OF THE

PROVINCE OF BRITISH COLUMBIA

FOR 15 MONTHS ENDING MARCH 31ST,

1920

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1920.

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Recreation-ground, New Westminster

Mental Hospital, New Westminster

To Colonel the Honourable EDWARD GAWLER PRIOR,

A Member of the King's Privy Council for Canada,

Lieutenant-Governor of the Province of British Columbia.

MAY IT PLEASE YOUR HONOUR:

The undersigned respectfully submits herewith the Annual Report of the Medical Superintendent of the Mental Hospitals for the fifteen months ending March 31st, 1920.

J. D. MACLEAN,

Provincial Secretary.

Provincial Secretary's Office.

OFFICERS AND STAFF, MENTAL HOSPITALS.

Officers at New Westminster.

Medical Staff:

C. E. Doherty, M.D., C.M., *Medical Superintendent.*
H. C. Steeves, M.D., C.M., *Assistant Medical Superintendent.*
D. W. McKay, M.D., *Assistant Physician.*
Lucy Sheppard, *Analyst.*

Clerical Staff:

Gowan S. Macgowan, *Bursar.* Thomas H. Cambridge, *Receiving Clerk.*

F. Gillard, *Clinical Clerk and Stenographer.*

Violet Stead, *Stenographer.*

Chaplains:

Rev. R. Lennie, Church of England. Rev. Father Murphy, Roman Catholic.

Nursing Staff and Trade Instructors:

Maria Fillmore, *Matron.*	W. F. Beggs, *Tailor.*	H. Bailey, *Farmer.*
J. P. O'Reilly, *Steward.*	J. McMillan, *Shoemaker.*	C. Slater, *Painter.*
R. T. Hall *Carpenter.*	F. Spooner, *Chief Attendant.*	E. B. Jones, *Laundryman.*
J. Booth, *Gardener.*	W. F. Johnston, *Engineer.*	H. Oliver, *Plumber.*

Officers of Essondale and Colony Farm.

Medical Staff:

C. E. Doherty, M.D., C.M., *Medical Superintendent.*
A. L. Crease, M.D., C.M., *Assistant Medical Superintendent and Pathologist.*
E. J. Ryan, M.D., C.M., *Assistant Physician.*
T. W. McAllister, M.D., *Assistant Physician.*

Clerical Staff, Head Office:

Gowan S. Macgowan, *Bursar.* C. Fletcher, *Chief Clerk.* M. H. McCabe, *Book-keeper.*
F. J. Fish, *Clinical Clerk and Stenographer.* Gladys Oakley, *Business Stenographer.*
I. H. Wedge, *History Stenographer.*

Chaplains:

Rev. C. Yates, Church of England. Rev. Father Marcucci, Roman Catholic.

Nursing Staff and Trades:

G. Mathewson, *Chief Attendant.*	J. L. Malcolm, *Chief Engineer.*
J. B. Foster, *Chief Cook.*	T. Mowbray, *Electrician.*
A. A. Killen, *Painter and Decorator.*	J. Symington, *Plumber.*
E. Fitzgerald, *Mason and Builder.*	E. B. Stinchcombe, *Outside Overseer.*
H. Lonsdale, *Carpenter.*	W. G. Armour, *Baker.*
J. Hargie, *Laundryman.*	W. J. Willows, *Barber.*

Colony Farm:

P. H. Moore, *Superintendent.* T. Weeks, *Record Clerk.*

REPORT OF THE MEDICAL SUPERINTENDENT

FOR THE FIFTEEN MONTHS ENDING MARCH 31ST, 1920.

PUBLIC HOSPITAL FOR THE INSANE,
NEW WESTMINSTER, B.C., March 31st, 1920.

The Honourable the Provincial Secretary,
Parliament Buildings, Victoria, B.C.

SIR,—I have the honour to submit herewith for your consideration the Forty-eighth Annual Report of the Public Hospitals at New Westminster, Essondale, and Saanich, embracing a record of the work performed at all Hospitals, together with suggestions for the further improvement of conditions in connection with the treatment of our insane, all of which I venture to hope may meet with the approval of your Department.

In submitting the report, I beg to call to your notice that, in order that the Mental Hospitals may be brought into line with other Provincial Government departments, the period covered by this report contains fifteen months, so that in future the annual reports of the institutions will date from April 1st to March 31st of the following year.

During the period from January 1st, 1919, to March 31st, 1920, there were admitted to the Hospitals 574 patients—403 males and 171 females. Of these, 166 were of foreign origin, including 47 from the U.S.A.; 234 were British and colonial other than Canada; 171 were Canadian, including 43 from our own Province; and 3 of unknown origin, being in such a mental state at their admission that they were unable to give any authentic information concerning themselves.

From this it will be seen that, as has been the case in former years, admissions from other countries greatly exceed those from Canada.

During the recent war there were a number of patients of German and Austrian birth admitted from the internment camps. Deportations to Europe were discontinued and it was not until after the cessation of hostilities that these patients could receive attention, and they were then dealt with as prisoners of war, and repatriated under the supervision of the Department of Internment Operations at Ottawa. These consisted of seven Germans and thirteen Austrians, one Austrian remaining behind owing to his extreme weakness.

Quite recently a very strong effort has been made, with the co-operation of the Chinese Consul, to secure the deportation of the majority of our Chinese patients, whose number amounts now to approximately sixty. This question is now under the consideration of the Chinese Government and pending their decision is in abeyance.

DRUG ADDICTS.

There is a movement on foot to admit drug addicts for treatment into the proposed psychopathic wing of the Vancouver General Hospital. In the meantime, however, it has been incumbent on the Hospitals for the Insane to share in the treatment of these cases. In the last fifteen months there have been ten cases of this type.

Experience has shown that these cases need rather prolonged treatment. By gradual stages the use of the drug is broken off, and the patient built up physically so as to render him in such condition that he may return to his former occupation, unhampered by his obsessions and with health renewed.

Cases of alcoholic psychosis continue in the same proportion as heretofore.

NATIONAL COMMITTEE FOR MENTAL HYGIENE.

In June, 1919, a complete survey of our Mental Hospitals was undertaken by the Canadian National Committee for Mental Hygiene, which included an examination of the conditions in connection with our insane and mental defectives.

As a result many recommendations were made by the committee, some new and some which echoed the opinions already expressed in previous reports from the Hospital. To quote a few of the committee's recommendations:—

I. The establishment of a psychopathic wing at the Vancouver General Hospital.
II. A building for acute cases at Essondale.
III. The erection of a Nurses' Home at New Westminster.
V. A Convalescent Home either at New Westminster or Essondale.
VI. Social service in connection with New Westminster and Essondale.
IX. Increase of medical staff.
X. Occupational therapy.
XI. Visits to other institutions.

Of all these, it may be said that their necessity, whether more or less vital, becomes more evident as the months go by.

Nos. I. and II. have been dealt with in previous reports, but of No. II. a further word may be added. It is to be hoped that during this year the proposed Acute Building will receive your attention and a definite start made on its erection. It should accommodate at least 200 patients and be fully equipped with all the apparatus essential to a psychopathic hospital. Short of this it would be handicapped from the beginning.

In the State immediately to the south of this Province a start was made with a Mental Hospital complete of the size of our present institution at Essondale. There are now three such and a fourth is under construction in the South Bend country.

Of recommendation No. III., it may be said that at the time of going to press the Nurses' Home is in a condition nearing completion, and by this time next year will be occupied and filling a long-felt want.

Nos. V., VI., IX., and XI., while they have not been brought to your notice through the medium of the annual report, have been discussed at various times. Of No. V., the National Committee's report says: "There is need for the building of a Convalescent Home in connection with the Mental Hospitals at either New Westminster or Essondale. It would be inexpensive to erect and maintain, and would materially facilitate the more rapid recovery of patient." The truth of this is obvious and cannot be too strenuously advocated.

Of No. VI., the report says in part: "The employment of one or two social workers in connection with the Mental Hospitals of the Province would, among other beneficial results, make possible the placing of an increased number of patients on parole."

It would do more: it would materially aid guardians of patients out on probation, and would obviate the necessity for their readmission by lending assistance in their care at home. Returns to the Hospital would be fewer than in the past, for there are those who, for lack of proper understanding, are unable to give that supervision which is so essential to the probationer.

No. IX., "Increase of medical staff," needs little explanation here, nor will I add anything, except to say that with the ever upward trend in the number of our insane, and the increasing methods adopted in their care, the duties of the medical staff become more complicated.

No. XI., "Visits to other institutions," might be enlarged in its scope to include arrangements whereby an exchange of visits could be made between institutions not only of other Canadian Provinces, but of the United States.

No. X., "Occupational therapy," of which the committee's report says: "Since mental deterioration is curbed, and since recoveries are more frequent when patients are usefully occupied, it is desirable to still further increase facilities along this line."

This matter was referred to at some length in last year's report. That which has been said of drug addicts and their care, with a view to building them up physically and mentally to fit them for return to outside life, is even more true of the insane.

To afford employment for as many as possible, to keep their minds free from worry and brooding, and to exercise their bodies, enabling them to enjoy sleep and build up an appetite for food, as much outside work as possible has been provided.

Active occupation, coupled with regular hours for sleep and meals, will assist tremendously in arresting the deterioration of the mind, and an increase in the facilities afforded in this respect is continuously sought.

But, of course, work and sleep are not all that is required even by those of us who are more fortunate; much less is it the case with those who come here to be restored to health. The

Mental Hospital, Essondale.

provision of games, music, weekly concerts, and moving-picture entertainments have been shown to be most valuable assets, and steps are being taken to provide for more extensive things in this direction.

Work was commenced this year on a larger open-air athletic ground, where tennis-courts, a baseball diamond, and football field could be laid out, allowing for a larger number of patients to participate.

It is hoped by these means to do something which will form in their minds a pleasing background to the daily work which they perform.

In conclusion, while this method of treatment benefits the patient, it also benefits the Province, inasmuch as it permits an earlier discharge of the patient than did the old method of close confinement, thereby relieving the Province of months, if not years, of maintenance cost.

SAANICH.

The taking-over of the building at Saanich for the accommodation of our male criminal insane was as timely as it was necessary. It has afforded a certain amount of relief to the overcrowded wards at New Westminster and Essondale, although this relief has been almost lost sight of in the increased admissions to those places.

The Mental Home opened on March 25th, 1919, with nine patients from the New Westminster Institution. At the close of the fifteen-months period under report there were ninety-nine. Among other changes, four had been discharged and two deaths had occurred.

MILITARY PATIENTS.

A certain number of returned soldiers, suffering from various forms of psychosis, not including shell-shock, have received treatment in our Hospitals.

The results shown are gratifying. The officers of the S.C.R., the G.W.V.A., and visiting members of the Canadian Red Cross Society have co-operated with us in extending our best efforts towards their recovery.

STAFF.

Since the termination of the war it has been our policy to employ, wherever possible, those who had seen service in any of His Majesty's Forces. All in the employ of the Hospitals prior to the war, and who so desired, have been reinstated in their former positions.

This opportunity is taken to pay a tribute to the work of Mr. W. E. Hunt, formerly Clinical Clerk at the New Westminster Institution, who at the close of the period of this report resigned his position to return to England for private reasons. His intimacy with the routine of office and Hospial made him a capable and much-valued servant, and it was with much regret that we bade him good-bye.

IMMIGRATION.

The warmest thanks of all legislating bodies is due to the Dominion Immigration Department for its strong stand in the matter of strict supervision of immigrants, whereby is prevented admission to the Dominion of those of deficient mentality or with a hereditary predisposition to insanity.

This again is a move in the right direction—towards the elimination of the source of trouble—of which the tables of nationality appended to this report are significant.

Recognition is also due to the inauguration of the system enforced as this goes to press, calling for the compulsory notification of cases of venereal diseases and the setting-up of official clinics for the treatment of this class of patient. Sooner or later this enactment will prove itself of inestimable value to the State.

RECOMMENDATIONS.

On account of the financial depression our building policy has of necessity been curtailed.

The experience of our neighbouring State has amply demonstrated that increase of population brings in its train an increase of insanity. This in its turn necessitates the augmenting of existing accommodation.

The building programme of this Province has not kept pace with the influx of population. It is, of course, largely a question of appropriation. We have never yet been able to catch up with, much less keep abreast of, our own conditions.

I would therefore once again bring to your notice the vital necessity, if this Province is to retain its advanced place in so far as its Mental Hospitals are concerned, of a fixed appropriation based on a moving yearly scale, from which the public needs in the care of its insane can be adequately met.

SUBNORMAL BOYS' SCHOOL.

The site for the Subnormal Boys' School has been chosen separately and apart from that upon which the Hospital for the Insane is situated, and contact with the insane is thus prevented.

The excavations for the buildings were made and the concrete foundations laid by the working patients of the Mental Hospital, so that the contractors were able to proceed with the superstructure; these buildings are already well advanced.

Much may be said for the site; it commands a most enchanting view of woods and river, on the main road from Vancouver, easily accessible from all parts, yet sufficiently removed from the city to ensure the freshest of country air; surrounded by large fields capable of affording recreation for the occupants of the School, as well as for space for farm development, this latter providing the work which is indispensable to the proper training of the mind. The School itself will be built on an elevation. Surely a combination of desirable things which should aid us materially in the attainment of our hopes—viz., the return to their homes and the creation of desirable citizens of as many as possible of those who may become our charges, and, what is of still greater importance, the gradual but ultimate elimination of the incipient criminal from the community at large by the segregation of the mentally subnormal.

HOME FOR THE FEEBLE-MINDED.

The relation of the Home for the Feeble-minded to the Subnormal Boys' School is of paramount importance. In the small building which was opened at Essondale in September last, experience has been gained which has proved sufficiently the necessity of a place where the lower grades can be cared for. The old carpenter's shop standing in the grounds of the Mental Hospital has been renovated and refitted, making a fairly comfortable home for some sixty children of the lower grades than those who, it is expected, will occupy the new school.

Here a small beginning has been made in the treatment of our feeble-minded. The Home is already overfull and a waiting-list has been opened. The benefit of having these types separate is realized. Those now in residence at the Home for the Feeble-minded are invariably happy; their days are occupied in light and varied tasks; their success as gardeners has been more marked even than was hoped for, while their own delight in the work of their nursery is noticeable. Picnics are arranged for them, occasional days are devoted to walks in the vicinity, and regular hours are set apart for games and recreation. Thus the children are rendered happy and healthy, and if there is that in their mentality which is fruitful ground it is brought out to its utmost.

These children are being graded under the Binet-Simon test for the determination of their mental age.

If, however, the ultimate goal is to be reached, and the underlying danger of the uncared-for mental defective is to be thoroughly removed, accommodation will be necessary for at least three times as many as are now resident, to absorb those among the committals to the Subnormal Boys' School whose classification may indicate segregation to the lower grades.

REVENUE.

I wish to especially direct your attention to the revenue of the Hospitals for the period covered by this report. You will note an increase of collections over former years, but will remember the amount shown is for a fifteen-months period. The diligence of this department of the Hospitals has made a considerable saving to the Province, as you will note by the difference between gross and net *per capita* cost of the care of patients.

The following synopsis will show at a glance the average *per capita* costs of the three Hospitals for the period of this report, and I feel should commend itself favourably when the tremendous increase in cost of all commodities is considered. Prices generally have increased at least 40 per cent., yet the *per capita* cost under these difficult conditions shows only a relatively small increase.

Provincial Mental Home, Saanich, B.C.

Total number of patients in Hospitals, March, 31st, 1920	1,458.00
Daily average population	1,408.09
Average gross maintenance *per capita* cost of all insane in three Hospitals	$1.05
Average net maintenance *per diem per capita* cost of all insane in three Hospitals	0.81

All financial transactions of the Hospitals are set forth in detail in the following tables and balance-sheets, and contain complete information regarding the handling of finances in connection with all departments of the Hospitals.

In closing this report, I wish to commend to your very favourable notice all officers of the Hospitals for their untiring efforts to improve their service to our patients and to raise the standard of our Hospitals to a greater point of efficiency. I wish also to acknowledge the loyal services of all employees of the Hospitals and to thank them for so ably doing their part in our great work.

To you, sir, I wish to express my most sincere thanks for your active co-operation and ready attention to all Hospital matters laid before you, and to assure you that your keen insight into matters pertaining to our Hospitals has been of the greatest assistance.

I have the honour to be,
Sir,
Your obedient servant,
C. E. DOHERTY,
Medical Superintendent.

LABORATORY REPORT.

It will be seen from the tables that there has been considerable increase in the amount of work done during the fifteen months, compared with former years.

The routine Wassermann has shown that 10 per cent. of those admitted were suffering from a luetic infection. In diseases of the central nervous system a blood Wassermann is sometimes negative, while the spinal fluid shows a positive reaction. As a result of this it has been our custom to do, in addition to the routine Wassermann, and in cases which appear to warrant it, a similar test on the spinal fluid. Useful information has been gained also by doing Noguchi's globulin test, to ascertain whether globulin is present, whether the cell-count reaches beyond the normal, whether the quantity of urea is increased, and whether or not bacteria is present.

There were twelve autopsies performed during the thirteen months, of which careful and complete record has been kept in each case. Specimens are being prepared in order to facilitate the teaching of the nursing staff.

During the coming year it is hoped that it will be possible to do physiological chemistry, and thus aid the doctors in following the sick patients more closely.

A good deal of laboratory-work has been done in connection with Colony Farm, principally in the blood tests for contagious abortion. Several different cultures of *Bacillus abortus* were obtained. These were grown anærobically on pork infusion agar, and poly valent antigen made. These have shown much benefit has been derived from the treatment given to the cattle by Mr. Moore and Dr. Jagger. The complement fixation was controlled in each case by the agglutination; the latter can be performed in the field, which, in some cases, makes it much more convenient. The latter was found to be not quite so sensitive as the former, but a valuable aid to the final readings. It is hoped that in future the Laboratory, in addition to the regular work, will co-operate even more closely with the dairying industry.

The Laboratory has suffered a serious loss in the death of the assistant, Mr. C. H. Gooding, who died from influenza, complicated with pneumonia, in March. He was a most careful and competent worker and invariably reliable. These qualities, coupled as they were with an abundance of irresistible cheerfulness, enhanced the value of his friendship and made his death the more difficult to realize.

The appended table shows in detail the work of the Laboratory during the period covered by this report. There are many phases of laboratory-work, especially along the lines of research, that we are anxious to take up, and hope to do so as soon as it can possibly be arranged to again bring the staff up to full working strength.

LABORATORY-WORK DONE, JANUARY 1ST, 1919, TO MARCH 31ST, 1920.

Urinalyses—	
Routine	510
Quantitative sugar	2
Solids	3
Urea	1
Blood—	
Wassermann tests for syphilis	562
Wassermann tests for gonococcus	4
Complete counts, R.W. and differential	356
Spinal fluids—	
Wassermann tests	18
Globulin	15
Cell-counts	13
Sugar	11
Bacteria	1
Cultures—	
Throat	251
Otitis externus	4
Eye	2

LABORATORY-WORK DONE—*Continued.*

Cultures—*Continued.*	
Mouth	2
Furunculosis	2
Pus	4
Blood	1
Sputa examinations for T.B.	17
Gastric analysis	1
Examination of fæces	4
Smears—	
Urethral for Gc.	10
Vaginal	1
Vidal's reaction for typhoid	7
Bacterial counts on milk	119
Bacterial counts on water	45
Autogenous vaccines	1

A. L. CREASE, M.D., C.M.,
Pathologist and Bacteriologist.

DENTAL REPORT.

PUBLIC HOSPITAL FOR THE INSANE,
NEW WESTMINSTER, B.C.

Medical Superintendent, Public Hospitals for Insane,
New Westminster, B.C.

SIR,—I beg to report the following dental work on patients in the Mental Hospitals, New Westminster and Essondale, during the period from January 1st, 1919, to March 31st, 1920, inclusive:—

Extractions	839
Amalgam fillings	142
Cement fillings	7
Porcelain fillings	17
Root canal	4
Scaling and cleaning	111
Pyorrhœa treatments	31
Plates	3
Resetting gold crowns	4
Repairing plates	16
Upper impressions	4
Dentures	3
Cement linings	2
Operated for necrosis	1
Anæsthetic cases	1
Various operations	167

I have, etc.,
F. P. SMITH, D.D.S.

FINANCIAL TABLES.

TABLE A.

Showing the Average Number of Patients in Residence each Year, the Total Amounts spent for Maintenance, and the Gross *Per Capita* Cost.

Year.	Average Number in Residence.	Maintenance Expenditure.	*Per Capita* Cost.
1872 (81 days)	16.57	$ 2,265 25	$616 00
1873	16.07	7,841 94	487 98
1874	16.76	8,232 41	491 20
1875	27.42	9,892 38	360 77
1876	36.41	12,558 18	344 91
1877	34.61	12,917 17	373 26
1878	36.52	13,985 05	382 93
1879	38.17	10,253 72	268 63
1880	45.42	10,552 18	232 32
1881	47.18	10,691 76	226 62
1882	47.86	11,343 65	237 02
1883	48.73	11,829 11	242 75
1884	48.70	11,843 94	243 20
1885	54.67	15,555 87	284 54
1886	59.11	15,334 43	259 42
1887	73.55	15,945 22	216 70
1888	79.43	16,261 06	204 72
1889	71.30	15,657 79	219 60
1890	78.78	17,577 80	223 13
1891	119.87	21,757 03	181 50
1892	125.24	23,518 37	187 80
1893	133 92	25,904 98	193 36
1894	148.64	26,495 83	178 25
1895	162.97	31,587 89	193 83
1896	171.43	32,001 40	186 67
1897	188.91	36,224 76	191 75
1898	216.53	46,420 25	214 38
1899	226.44	54,917 45	242 52
1900	243.24	59,349 20	244 00
1901	269.56	55,406 08	205 54
1902	296.62	55,345 65	186 59
1903	332.23	59,353 57	178 65
1904	351.55	66,052 76	187 89
1905	340.90	63,342 07	185 80
1906	374.57	66,596 69	177 79
1907	419.24	74,874 64	178 59
1908	490.80	90,269 49	183 92
1909	526.85	96,586 32	183 32
1910	563.33	103,900 44	184 43
1911	641.02	126,782 50	197 78
1912	736.72	130,924 06	177 71
1913, M.H., New Westminster	550.54	119,663 71	217 36
1913, M.H., Essondale (9 months)	384.07	71,079 84	184 76
1914, M.H., New Westminster	487.24	125,981 45	258 56
1914, M.H., Essondale	489.07	131,420 44	268 36
1915, M.H., New Westminster	515.74	123,021 70	238 53
1915, M.H., Essondale	560.56	123,878 43	220 99
1916, M.H., New Westminster	524.17	116,052 21	221 40
1916, M.H., Essondale	633.13	155,698 37	245 91
1917, M.H., New Westminster	535.66	124,124 68	231 72
1917, M.H., Essondale	716.35	166,231 51	232 05
1918, M.H., New Westminster	585 38	156,574 85	267 47
1918, M.H., Essondale	752.78	222,097 37	295 03
1919-20, M.H., New Westminster (15 months)	562.12	236,631 90	420 97
1919-20, M.H., Essondale (15 months)	755.46	357,630 99	473 38
1919-20, M.H., Saanich (373 days)	90.51	40,433 28	446 72

TABLE B.

Showing Analysis of the *Per Capita* Cost.

Year.	Salaries.	Provisions.	Clothing.	Fuel and Light.	Furniture.	Medicines.	Miscellaneous.	Total.
1872.....	$279 38	$184 03	$55 81	$22 44	$15 55	$10 18	$49 30	$616 69
1873.....	221 48	166 81	14 55	23 65	21 59	7 74	32 16	487 98
1874.....	231 10	152 10	22 07	23 98	28 36	7 78	25 81	491 20
1875.....	153 82	113 40	13 98	16 88	25 45	6 73	30 51	360 77
1876.....	143 34	114 45	18 68	22 75	17 90	2 86	24 93	344 91
1877.....	177 15	126 75	20 69	4 66	20 75	3 74	19 52	373 26
1878.....	176 16	124 23	30 43	13 94	7 20	9 16	21 82	382 93
1879.....	134 27	95 10	3 25	15 91	6 39	6 31	7 40	268 63
1880.....	111 84	87 71	5 74	14 06	6 00	3 63	3 34	332 32
1881.....	112 44	81 14	6 86	12 73	5 55	2 56	5 34	226 62
1882.....	121 51	84 52	7 05	12 30	4 54	3 49	3 61	237 02
1883.....	123 81	92 56	6 03	11 04	4 26	2 24	2 82	242 75
1884.....	124 02	90 64	7 03	12 43	4 14	2 77	2 18	243 20
1885.....	169 05	84 33	6 33	15 05	3 90	2 93	2 95	284 54
1886.....	159 03	69 35	5 49	16 20	3 72	1 59	4 04	259 42
1887.....	127 80	59 10	5 88	15 38	3 88	98	3 81	216 78
1888.....	118 34	60 47	4 41	13 90	3 11	2 09	2 40	204 72
1889.....	131 70	59 11	7 20	12 93	4 13	2 07	2 46	219 60
1890.....	121 54	62 77	9 02	17 31	4 00	1 29	7 19	223 12
1891.....	88 35	54 79	3 83	20 43	3 40	1 89	8 81	181 50
1892.....	94 25	56 74	4 69	20 53	3 35	1 80	6 42	187 80
1893.....	95 50	53 55	5 43	22 60	3 39	2 69	10 20	193 36
1894.....	87 76	57 07	5 25	18 83	2 98	1 43	4 93	178 25
1895.....	90 83	61 15	9 90	20 41	2 51	3 10	5 93	193 83
1896.....	89 13	55 93	6 30	20 29	2 56	3 63	8 83	186 67
1897.....	89 09	58 18	8 36	19 11	2 95	3 86	10 20	191 75
1898.....	94 68	69 43	9 94	21 82	2 76	5 12	10 62	214 37
1899.....	113 31	72 91	8 31	33 96	2 50	2 73	8 80	242 52
1900.....	116 04	72 62	9 06	32 10	2 15	1 71	10 32	244 00
1901.....	99 16	66 65	10 12	18 52	3 25	1 07	6 77	205 54
1902.....	87 47	61 13	7 95	15 25	4 13	1 20	9 46	186 59
1903.....	82 36	57 86	8 58	14 77	3 24	1 91	9 93	178 65
1904.....	87 43	60 01	6 85	17 84	4 48	2 10	9 18	187 89
1905.....	92 17	54 09	5 99	17 93	3 83	2 03	9 76	185 80
1906.....	88 76	53 15	5 16	15 92	3 57	1 21	10 02	177 79
1907.....	89 18	48 47	5 81	19 82	3 02	1 57	10 72	178 59
1908.....	90 93	49 17	6 61	17 63	4 56	1 79	13 23	183 92
1909.....	94 27	53 41	8 16	13 02	2 78	84	10 84	183 32
1910.....	95 97	48 43	7 87	21 32	2 02	1 15	7 67	184 43
1911.....	97 44	58 08	9 39	18 84	1 12	1 87	11 04	197 78
1912.....	78 40	56 37	10 09	19 36	1 79	1 50	10 20	177 71
1913, M.H., New West.	102 37	54 07	9 43	25 27	4 74	3 21	18 27	217 36
1913, M.H., Essondale.	93 56	49 90	5 50	25 13	55	1 02	14 10	184 76
1914, M.H., New West.	115 72	68 15	2 99	24 13	69	2 64	44 24	258 56
1914, M.H., Essondale.	113 06	81 42	15 49	28 93	4 14	1 19	24 13	268 36
1915, M.H., New West.	110 94	64 32	7 57	20 30	....	1 88	33 52	238 53
1915, M.H., Essondale.	95 25	62 84	9 44	24 87	1 14	56	26 89	220 99
1916, M.H., New West.	105 89	74 96	2 58	18 52	....	1 45	18 00	221 40
1916, M.H., Essondale.	89 26	75 18	17 76	26 96	4 98	42	31 35	245 91
1917, M.H., New West.	103 41	72 20	10 52	18 29	....	2 38	24 92	231 72
1917, M.H., Essondale.	83 57	79 98	18 92	23 39	4 77	81	20 61	232 05

TABLE B 1.

Showing Analysis of the Gross *Per Capita* Cost.

Year.	Salaries.	Office Supplies.	Travelling Expenses.	Fuel, Water, Light.	Repairs and Renewals.	Furniture and Fixtures, Bedding, etc.	Provisions.	Clothing, Boots, and Slippers.	Medical and Surgical Supplies.	Examination, Committal, and Transportation.	Incidentals and Unforeseen.	Total Gross.
1918, New Westminster	$102.815	$2.133	$0.097	$27.186	$3.706	$9.547	$ 99.989	$ 7.103	$2.102	$4.103	$8.694	$267.47
1918, Essondale.....	96.777	3.000	0.482	33.378	5.849	8.438	118.888	17.235	1.663	0.060	9.266	295.03
1919-20, New Westminster (15 months)..	168.789	4.375	0.581	45.794	19.216	10.052	133.599	5.467	5.061	14.230	13.806	420.970
1919-20, Essondale (15 months)	155.850	3.812	1.218	47.000	31.584	12.414	176.575	27.488	2.118	1.466	13.856	473.381
1919-20, Saanich (373 days).....	160.550	4.954	3.372	41.927	15.894	10.336	140.601	26.270	1.931	6.183	34.708	446.726

Table C.

Showing the Total Expenditure of the Mental Hospital annually since its Inception, analysed under its Various Headings.

Year.	Salaries.	Provisions.	Clothing.	Fuel and Light.	Furniture (estimat'd)	Medicines, etc.	Miscellaneous.	Total of Current Expenditure.	Expenditure on Capital Account.			
									New Furniture.	Library.	Surgical Instruments.	Lands and Works.
1872-87	$91,899 70	$59,567 24	$6,482 84	$9,317 03	$5,331 52	$2,307 04	$6,131 55	$181,042 26	$2,600 00	.....	.....	$917 26
1888	9,399 96	4,803 57	350 17	1,103 86	247 24	165 60	190 66	16,261 06	.....	.....	$ 32 00	224 34
1889	9,390 62	4,214 19	513 73	922 00	293 69	147 76	175 80	15,657 79	.....	.....	.....	625 56
1890	9,575 13	4,945 57	710 64	1,363 52	315 28	101 90	565 96	17,577 80	2,800 00	.....	.....	2,181 91
1891	10,590 28	6,568 27	459 58	2,449 09	406 84	226 31	1,056 66	21,757 03	900 00	.....	.....	1,001 86
1892	11,803 83	7,106 64	587 48	2,571 26	418 82	226 19	804 15	23,518 37	.....	.....	.....	433 99
1893	12,790 28	7,172 53	729 38	3,029 00	452 55	362 08	1,369 16	25,904 98	650 00	$ 19 00	10 75	718 49
1894	13,044 16	8,492 53	771 05	2,799 87	442 69	212 86	732 67	26,495 83	200 00	.....	.....	170 32
1895	14,802 47	9,963 54	1,611 96	3,324 54	419 01	502 90	963 47	31,587 89	1,800 00	.....	.....	1,915 28
1896	15,280 62	9,588 22	1,079 85	3,479 46	439 36	623 24	1,511 05	32,001 40	800 00	.....	148 01	1,126 74
1897	16,829 76	10,991 05	1,579 08	3,610 03	557 97	728 73	1,928 14	36,224 76	1,200 00	5 15	19 00	848 38
1898	20,502 31	15,032 71	2,153 11	4,725 96	598 05	1,109 66	2,298 45	46,420 25	2,700 00	.....	6 39	5,320 30
1899	25,658 15	16,511 05	1,882 13	7,690 35	566 86	617 27	1,991 64	54,917 45	1,300 00	8 60	.....	2,518 80
1900	28,224 96	17,665 60	2,203 97	7,807 15	521 96	415 10	2,510 46	59,349 20	2,400 00	29 10	11 89	1,806 10
1901	26,729 01	17,967 31	2,727 11	4,993 67	875 30	288 40	1,823 28	55,406 08	1,840 53	25 10	14 65	5,175 20
1902	25,945 89	18,132 13	2,359 90	4,525 45	1,221 87	354 38	2,806 03	55,345 65	1,157 47	104 20	19 20	5,561 42
1903	27,362 37	19,222 50	2,850 19	4,906 22	1,077 73	634 16	3,300 40	59,353 57	1,723 70	111 48	9 00	8,426 70
1904	30,735 95	21,096 19	2,409 34	6,271 55	1,574 84	738 85	3,226 04	66,052 76	1,463 48	132 53	16 95	4,593 88
1905	31,421 45	18,437 99	2,043 45	6,110 76	1,306 22	693 49	3,328 71	63,342 07	1,711 84	91 47	69 15	3,981 72
1906	33,243 80	19,908 19	1,934 15	5,965 32	1,337 80	453 41	3,754 02	66,596 69	1,365 76	100 30	114 16	5,564 03
1907	37,394 21	20,326 99	2,439 64	8,314 36	1,265 63	655 66	4,498 15	74,874 64	4,352 22	150 88	144 63	9,410 66
1908	44,626 20	24,132 49	3,244 77	8,652 81	2,239 68	877 40	6,496 14	90,269 49	5,646 86	127 50	91 01	10,775 00
1909	49,665 85	28,142 65	4,298 91	6,856 11	1,465 79	441 59	5,715 42	96,586 32	2,598 95	89 58	21 30	16,615 10
1910	54,049 80	27,278 49	4,437 29	12,014 30	1,141 57	653 09	4,325 90	103,900 44	4,043 58	139 76	9 50	12,465 08
1911	62,453 00	37,229 56	6,020 57	12,079 62	722 10	1,200 92	7,076 73	126,782 50	11,169 78	154 75	43 82	14,429 02
1912	57,755 68	41,531 72	7,433 68	14,266 18	1,318 66	1,105 82	7,512 32	130,924 06	4,477 21	187 46	301 15	13,144 06
1913, New Westminster.	56,359 76	29,767 27	5,191 33	13,909 72	2,608 03	1,767 42	10,060 18	119,663 71	4,697 77	131 93	69 13	17,701 00
1913, Essondale. (9 mos.)	35,993 98	17,271 35	2,117 73	9,669 99	208 76	395 80	5,422 23	71,079 84	46,680 54	212 79	.....	14,904 63
1914, New Westminster.	56,381 62	33,204 11	1,455 28	11,758 11	338 03	1,286 68	21,557 62	125,981 45	.....	4,417 50	.....	10,117 16
1914, Essondale	55,364 40	39,873 66	7,585 71	14,168 66	2,026 29	584 23	11,817 49	131,420 44	1,087 31	.....	.....	4,236 37
1915, Essondale	53,392 50	35,225 51	5,287 03	13,942 39	639 67	316 87	15,074 46	123,878 43	841 31	.....	.....	4,628 99
1915, New Westminster.	57,217 21	33,174 90	3,902 49	10,469 03	.....	969 58	17,288 49	123,021 70	1,044 11	.....	.....	5,910 38
1916, New Westminster.	55,501 35	39,294 07	1,349 48	9,696 04	.....	777 94	9,433 33	116,052 21	1,395 09	.....	.....	8,623 88
1916, Essondale	56,515 64	47,601 27	11,242 29	17,066 96	3,154 13	268 96	19,849 12	155,698 37	2,418 80	.....	.....	14,402 82
1917, New Westminster.	55,393 19	38,674 92	5,639 40	9,795 36	.....	1,275 54	13,346 27	124,124 68	1,538 13	.....	.....	3,455 96
1917, Essondale	59,862 30	57,294 25	13,555 03	16,759 02	3,415 42	578 58	14,766 91	166,231 51	1,611 63	.....	.....	10,515 80

TABLE C 1.

Showing Gross Expenditure in Profit and Loss Accounts for Year analysed under its Various Headings.

Year.	Salaries.	Office Supplies and Postage.	Travelling Expenses.	Fuel, Water, Light, and Power.	Repairs and Renewals.	Furniture and Fixtures, Bedding, etc.	Provisions.	Clothing, Boots, and Slippers.	Medical and Surgical Supplies.	Examination, Committal, and Transportation.	Incidentals and Unforeseen.	Total Gross.
1918, New Westminster	$60,185 88	$1,248 42	$ 57 32	$15,913 89	$2,169 74	$5,588 44	$58,531 74	$ 4,157 86	$1,230 61	$2,401 62	$5,089 33	$156,574 85
1918, Essondale..	72,853 08	2,258 13	363 14	25,126 54	4,403 10	6,351 27	89,496 23	12,974 41	1,252 08	44 75	6,975 64	222,097 37
1919-20, New Westminster (15 months) ..	94,878 17	2,459 16	326 40	25,741 44	10,801 50	5,650 38	75,097 52	3,073 27	2,844 64	7,998 75	7,760 67	236,631 90
1919-20, Essondale (15 months)	117,738 67	2,879 47	920 30	35,512 26	23,860 37	9,380 10	133,395 18	20,766 40	1,601 14	1,107 67	10,469 43	357,630 99
1919-20, Saanich (373 days).....	14,531 52	448 35	305 12	3,794 84	1,438 56	935 58	12,725 70	2,377 75	174 86	559 65	3,141 35	40,433 28

TABLE D.

Summary Statement showing the Gross and Net *Per Capita* Cost of Insane Patients in the Three Institutions.

Mental Hospital, New Westminster—			
Total maintenance vouchers (15 months)		$223,661 00	
Colony Farm Produce Account		25,648 12	
Essondale Hospital Account for ice, wood, cloth, etc.		6,179 34	
Dec. 31, 1918. Inventory, coal		3,159 80	
" " " engineer's material		2,951 88	
" " " furniture and fixtures		2,314 51	
" " " provisions		368 49	
" " " clothing		2,157 77	
" " " sundries		6 75	
		$266,447 66	
Less Tailor Account for Essondale, clothing	$ 9,004 10		
" boots and slippers, Essondale	87 00		
" sundry supplies, Essondale	974 45		
" Tailor Account, Saanich	1,082 15		
" Colony Farm Account, *re* hogman	1,515 00		
" Colony Farm, sundries	605 00		
" Colony Farm Account, patient-labour	1,824 00		
" Mar. 31, 1920. Inventory, coal	33 35		
" " " " engineer's material	3,176 04		
" " " " furniture and fixtures	2,130 92		
" " " " provisions	3,966 02		
" " " " clothing	7,128 55		
" " " " miscellaneous	113 18		
		31,639 76	
Total, New Westminster Hospital			$234,807 90
Mental Hospital, Essondale—			
Total maintenance vouchers (15 months)		$321,360 22	
Colony Farm Produce Account		57,489 15	
New Westminster Institution, Tailor Account		9,004 10	
" " Shoemaker Account		87 00	
" " sundry supplies		974 45	
Dec. 31, 1918. Inventory, coal and wood		2,521 66	
" " " engineer's material		2,477 71	
" " " furniture and fixtures		5,345 89	
" " " provisions		1,868 90	
" " " clothing		8,140 27	
		$409,269 35	
Less supplies to New Westminster Hospital	$ 6,179 34		
" Colony Farm, sundries	483 60		
" " fuel, clothing	3,215 55		
" " board of employees	12,764 00		
" " patient-labour	16,524 00		
" S.C.R. Department, meals for students	5,166 40		
" furniture and fixtures, transferred to Capital A/c.	4,484 94		
" Mar. 31, 1920. Inventory, coal	1,611 05		
" " " " engineer's material	3,984 20		
" " " " furniture and fixtures	2,687 35		
" " " " provisions	2,244 71		
" " " " clothing	8,666 48		
" " " " miscellaneous	150 74		
		68,162 36	
Total, Essondale Hospital			341,106 99
Carried forward			$575,914 89

TABLE D—*Continued.*

Summary Statement showing the Gross and Net *Per Capita* Cost—*Continued.*

Brought forward			$575,914 89
Mental Hospital, Saanich—			
Total maintenance vouchers (373 days)		$ 49,796 43	
Colony Farm, sundry supplies		270 70	
New Westminster Hospital, clothing and uniforms		1,082 15	
		$ 51,149 28	
Less transferred to Capital Account	$ 9,102 97		
„ Mar. 31, 1920. Inventory, coal	231 00		
„ „ „ „ provisions	112 13		
„ „ „ „ clothing	542 90		
„ „ „ „ medical and surgical supplies	215 00		
„ „ „ „ miscellaneous	512 00		
		10,716 00	
Total, Saanich Hospital			40,433 28
Total expenses, New Westminster Hospital (15 mos.), Essondale Hospital (15 mos.), Saanich Hospital (373 days)			$616,348 17
Less collections remitted to Treasury—			
Mental Hospital, New Westminster		$ 45,921 06	
„ „ Essondale		53,740 40	
„ „ Saanich		3,215 39	
			102,876 85
Total net charge of the three Hospitals, New Westminster and Essondale (15 months), Saanich Hospital (373 days)			$513,471 32

Showing a net *per capita* cost at the rate of $297.01 per year, or 81.37 cents per day.

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Expense and Revenue Statement of the New Westminster Hospital for 15 Months ending March 31st, 1920.

Operating Expense Accounts.	Amounts.	Totals.
Operating expenditure by voucher—		
Salaries—		
Civil Service staff	$13,646 60	
Staff and employees	82,746 57	
		$ 96,393 17
Office supplies, etc.—		
Books, journals, stationery, etc.	$ 435 72	
Postage and office supplies	1,149 65	
Telephone and telegraph	873 79	
		2,459 16
Travelling expenses	.....	326 40
Fuel, water, light, and power—		
Fuel	$15,404 48	
Water	3,384 53	
Light and power	3,780 98	
		22,569 99
Maintenance and repairs of buildings, etc.—		
Repairs and renewals	$ 9,628 53	
Janitor's supplies, etc.	1,264 98	
		10,893 51
Furniture and fixtures—		
Bedding, etc.	$ 1,905 84	
Furniture and fixtures	1,876 99	
Miscellaneous	1,181 64	
		4,964 47
Provisions—.		
Groceries	$37,609 03	
Meats	15,013 59	
Fish	3,370 61	
		55,993 23
Clothing, boots, slippers, etc.—		
Clothing	$11,940 46	
Boots and slippers	2,181 44	
		14,121 90
Medical and surgical supplies—		
Medicine and drugs	$ 1,325 29	
Instruments and surgical supplies	1,359 58	
		2,684 82
Examinations, committals, and transportation—		
Examinations	$ 855 85	
Committals	67 50	
Transportation	7,075 40	
		7,998 75
Incidentals and unforeseen—		
Amusements	$ 474 55	
Gratuities	56 85	
Funerals	623 00	
Auto tires and tubes	305 26	
Auto repairs and parts	184 44	
Gasolene and oil	983 19	
Tools and garden implements	218 83	
Freight and cartage	90 55	
Miscellaneous	2,318 93	
		5,255 60
Total expenditure for 15 months by voucher ...	.....	$223,661 00
Institution Trading Accounts—		
Colony Farm supplies—		
Dairy supplies	$11,870 52	
Vegetables, fruit, and honey	4,451 48	
Beef, pork, mutton, fowl	6,469 37	
Horse-labour, etc.	2,856 75	
		25,648 12
Essondale Hospital—Clothing, wood, ice, etc.	.....	6,179 34
		$255,488 46

15 Mos. *Per Capita* Cost.	Summary of Profit and Loss Accounts.		Yearly *Per Capita* Cost.
$168.789	Salaries	$ 94,878 17	$135.032
	Expenses—		
4.375	Office supplies, etc.	2,459 16	3.500
.581	Travelling expenses	326 40	.464
45.794	Fuel, water, light, and power	25,741 44	36.635
19.216	Maintenance and repairs of buildings	10,801 50	15.373
10.052	Furniture and fixtures, bedding, etc.	5,650 38	8.042
133.599	Provisions	75,097 52	106.879
5.467	Clothing, boots, slippers, etc.	3,073 27	4.374
5.061	Medical and surgical supplies, etc.	2,844 64	4.048
14.230	Examinations, committals, transportation	7,998 75	11.384
13.806	Incidentals and unforeseen	7,760 67	11.045
$420.970	Total gross expenditure	$236,631 90	$336.776
3.245	*Less* patient-labour (against market price, Farm A/c.)	1,824 00	2.596
$417.725		$234,807 90	$334.180
81.694	*Less* receipts of revenue (maintenance)	45,921 06	65.354
$336.031	Net cost to Govt. for maintenance of patients ..	$188,886 84	$268.826

Remarks.

Total patients in residence, New Westminster, March 31st, 1920	563
Daily average population, New Westminster, March 31st, 1920	562.12
Gross maintenance *per capita* cost, 15 months	$420.97
„ „ „ 1 year	336.78
„ „ „ 1 day	.9231
Net maintenance *per capita* cost, 15 months	336.03
„ „ „ 1 year	268.82
„ „ „ 1 day	.7369

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TABLE F.

Expense and Revenue Statement of the Essondale Hospital for Year ending March 31st, 1920.

Operating Expense Accounts.	Amounts.	Totals.	15 Mos. *Per Capita* Cost.
Operating expenditure by voucher—			$155.850
Salaries—			
Civil Service staff	$ 15,600 00		3.812
Staff and employees	102,138 67	$117,738 67	1.218
Office supplies, etc.—			47.000
Books, journals, stationery, etc.	$ 158 03		31.584
Postage and office supplies	1,561 65		12.414
Telephone and telegraph	1,185 14	2,904 82	176.575
Travelling expenses	.....	920 30	27.488
Fuel, water, light, and power—			2.118
Fuel	$ 26,238 30		1.466
Water	5,944 03		13.856
Light and power	4,310 12	36,492 45	$473.381
Maintenance and repairs of buildings, etc.—			21.859
Repairs and renewals	$ 21,515 48		$451.522
Janitor's supplies, etc.	4,197 64	25,713 12	71.136
Furniture and fixtures—			$380.386
Bedding, etc.	$ 6,119 32		
Furniture and fixtures	5,314 36		
Miscellaneous	275 14	11,708 82	
Provisions—			
Groceries	$ 67,260 77		
Meats	25,318 47		
Fish	4,596 24	97,175 48	
Clothing, boots, and shoes—			
Clothing	$ 13,427 66		
Boots and shoes	3,044 25	16,471 91	
Medical and surgical supplies—			
Medicine and drugs	$ 896 19		
Instruments and surgical supplies	868 77	1,764 96	
Examinations, committals, and transportation—			
Examinations	$ 111 50		
Committals	2 50		
Transportation	993 67	1,107 67	
Incidentals and unforeseen—			
Amusements	$ 972 04		
Gratuities	409 90		
Funerals	930 00		
Auto tires and tubes	466 01		
Auto repairs and parts	660 33		
Gasolene and oil	1,984 58		
Tools and implements	124 31		
Freight and cartage	55 42		
Miscellaneous	3,759 43	9,362 02	
Total expenditure for 15 months by voucher ...	.....	$321,360 22	
Institution Trading Accounts—			
Colony Farm supplies—			
Dairy supplies	$ 23,257 31		
Beef, pork, mutton, etc.	10,007 64		
Horse-labour, etc.	3,029 00		
Miscellaneous	23 79	36,317 74	
Garden and nursery—Vegetables and garden-truck, fruit, honey, and flowers	.....	15,750 25	
Poultry—Eggs and fowl	.....	5,421 16	
Hospital's Industrial Departments—			
Tailor-shop—			
Uniforms	$ 4,771 60		
Patients' clothing	4,232 50	9,004 10	
Shoemaker-shop—Boots and slippers	.....	87 00	
New Westminster Hospital—Sundry supplies	.....	974 45	
		$388,914 92	

Summary of Profit and Loss Accounts.		Yearly *Per Capita* Cost.
Salaries	$117,738 67	$124.680
Expenses—		
Office supplies, etc.	2,879 47	3.049
Travelling expenses	920 30	.974
Fuel, water, light, and power	35,512 26	37.600
Maintenance and repairs of buildings	23,860 37	25.267
Furniture and fixtures	9,380 10	9.931
Provisions	133,395 18	141.260
Clothing, etc.	20,766 40	21.990
Medical and surgical supplies, etc.	1,601 14	1.695
Examinations, committals, transportation	1,107 67	1.173
Incidentals and unforeseen	10,469 43	11.085
Total gross expenditure	$357,630 99	$378.704
Less patient-labour (against market price, Farm A/c.)	16,524 00	17.487
	$341,106 99	$361.217
Less receipts of revenue (maintenance)	53,740 40	56.908
Net cost to Govt. for maintenance of patients ..	$287,366 59	$304.309

Remarks.

Total patients in residence, Essondale, March 31st, 1920	796
Daily average population, Essondale, March 31st, 1920	755.46
Gross maintenance *per capita* cost, 15 months	$473.38
„ „ „ 1 year	378.70
„ „ „ 1 day	1.038
Net maintenance *per capita* cost, 15 months	380.38
„ „ „ 1 year	304.30
„ „ „ 1 day	.8342

Capital Expenditure.

Additions and improvement of buildings	$25,168 60
Grading and improvement of grounds	1,715 47
Total	$26,884 07

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TABLE G.

Expense and Revenue Statement of the Saanich Hospital for 12 Months ending March 31st, 1920.

Operating Expense Accounts.	Amounts.	Totals.
Operating expenditure by voucher—		
Salaries—		
Civil Service staff	$ 2,406 93	
Employees	12,124 59	
		$ 14,531 52
Office supplies, etc.—		
Books, journals, stationery, etc.	$ 20 00	
Postage and office supplies	266 15	
Telephone and telegraph	162 20	
		448 35
Travelling expenses	.....	305 12
Fuel, water, light, and power—		
Fuel	$ 2,775 68	
Water	19 08	
Light and power	1,231 08	
		4,025 84
Maintenance and repairs of buildings—		
Repairs and renewals	$ 3,729 31	
Janitor's supplies, etc.	177 00	
		3,906 31
Furniture and fixtures—		
Bedding, etc.	$ 2,916 72	
Furniture and fixtures	2,951 88	
		5,868 60
Provisions—		
Groceries and flour	$ 9,393 21	
Meats	2,738 19	
Fish	570 08	
		12,701 48
Clothing, boots, and shoes—		
Clothing	$ 1,418 70	
Boots and shoes	419 80	
		1,838 50
Medical and surgical supplies—		
Medicine and drugs	$ 200 11	
Instruments and surgical supplies	189 75	
		389 86
Examinations, committals, and transportation	.....	559 65
Incidentals and unforeseen—		
Amusements	$ 326 30	
Auto repairs and parts	122 25	
Gasolene and oil	89 59	
Tools and implements	231 89	
Freight and cartage	121 07	
Sundries	2,627 90	
		3,519 00
Expended from maintenance vote on Capital Account—		
Truck	$ 1,067 20	
Airing-court	635 00	
		1,702 20
Total expenditure for 12 months by voucher ...	.....	$ 49,796 43
Institution Trading Accounts—		
Colony Farm—Sundry supplies	.....	270 70
New Westminster Hospital—Clothing and uniforms	.....	1,082 15
		$ 51,149 28

Summary of Profit and Loss Accounts.		Yearly *Per Capita* Cost.
Salaries	$14,531 52	$160.550
Expenses—		
Office supplies, etc.	448 35	4.954
Travelling expenses	305 12	3.372
Fuel, water, light, and power	3,794 84	41.927
Maintenance and repairs of buildings	1,438 56	15.894
Furniture and fixtures	935 58	10.336
Provisions	12 725 70	140.601
Clothing, etc.	2,377 75	26.270
Medical and surgical supplies	174 86	1.931
Examinations, committals, transportation	559 65	6.183
Incidentals and unforeseen	3,141 35	34.708
Total gross expenditure	$40,433 28	$446.726
Less receipts of revenue (maintenance)	3,215 39	35.525
Net cost to Government for maintenance of patients	$37,217 89	$411.201

Remarks.

Total patients in residence, March 31st, 1920	99
Daily average population for 12 months (373 days)	90.51
Gross maintenance *per capita* cost per year	$446.72
„ „ „ per day	1.20
Net maintenance *per capita* cost per year	411.20
„ „ „ per day	1.10

REVENUE.

You will note that the revenue of the Hospital shows considerable increase over any previous years. Close attention was given this matter, but I feel sure that we have in no instance worked a hardship on relatives of patients where leniency should have been shown.

The following table will show clearly the yearly collections at this office since the time of the institution's inception, and is worthy of your notice:—

1873	$1,440 99	1891	$ 761 15	1909	$25,845 65
1874	680 00	1892	2,418 43	1910	26,137 38
1875	1,342 60	1893	1,585 40	1911	30,100 20
1876	730 31	1894	2,709 53	1912	35,151 97
1877	799 91	1895	4,409 23	1913	40,756 56
1878	479 42	1896	3,741 71	1914	42,731 83
1879	867 38	1897	3,816 80	1915, New West.	18,046 21
1880	1,433 04	1898	4,003 79	1915, Essondale.	16,329 72
1881	614 99	1899	4,769 04	1916, New West.	18,135 91
1882	505 18	1900	6,893 33	1916, Essondale.	21,889 74
1883	298 24	1901	12,800 76	1917, New West.	21,435 93
1884	98 35	1902	10,926 23	1917, Essondale.	25,350 09
1885	.....	1903	13,639 64	1918, New West.	35,169 86
1886	50 00	1904	15,004 22	1918, Essondale.	32,100 14
1887	720 59	1905	16,613 18	1919-20, N. West.	45,921 06
1888	750 00	1906	19,058 42	1919-20, Es'ndale	53,740 40
1889	220 00	1907	20,753 35	1919-20, Saanich	3,215 39
1890	599 24	1908	25,807 83		

PUBLIC HOSPITAL FOR INSANE, NEW WESTMINSTER—BALANCE-SHEET, MARCH 31ST, 1920.

Assets.

Land		$ 80,000 00
Buildings		440,565 00
Plant, etc.		14,713 18
Furniture and fixtures		17,900 00
Accounts receivable—		
Mental Hospital, Essondale	$ 8,458 86	
Mental Hospital, Saanich	1,082 15	
		9,541 01
Inventories—		
Provisions	$ 3,966 02	
Coal	33 35	
Furniture and fixtures	2,130 92	
Maintenance and repairs	3,176 04	
Clothing	3,701 40	
Miscellaneous	113 18	
Ward stores	3,427 15	
		16,548 06
Deficit—		
1918 (cost of operating)	$119,964 99	
1919-20 (cost of operating)	188,886 84	
		308,851 83
		$888,119 08

Liabilities.

Surplus Account	$859,560 92
Colony Farm	28,558 16
	$888,119 08

PUBLIC HOSPITAL FOR INSANE, NEW WESTMINSTER—BALANCE-SHEET—*Continued.*

Profit and Loss.

Salaries	$ 94,878 17	
Office supplies	2,459 16	
Travelling expenses	326 40	
Fuel, water, light, etc.	25,741 44	
Maintenance and repairs	10,801 50	
Furniture and fixtures	5,650 38	
Provisions	75,097 52	
Clothing	3,073 27	
Medical and surgical	2,844 64	
Examinations, committals, etc.	7,998 75	
Incidentals and unforeseen	7,760 67	
Patient-labour	.....	$ 1,824 00
Collections	.....	45,921 06
Net cost of operations	.....	188,886 84
	$236,631 90	$236,631 90

MENTAL HOSPITAL, ESSONDALE—BALANCE-SHEET, MARCH 31ST, 1920.

Assets.

Land		$ 108,491 90
Buildings		566,255 02
Furniture and fixtures		36,008 28
Plans and equipment		40,950 00
S.C.R. Department		5,166 40
Inventories—		
Provisions	$ 2,244 71	
Clothing	6,954 35	
Furniture and fixtures	2,687 35	
Miscellaneous	150 74	
Ward stores	1,712 13	
Coal	1,611 05	
Maintenance and repairs	3,984 20	
		19,344 53
Deficit, 1918 (cost of operating)		175,097 23
„ 1919-20 (cost of operating)		287,366 59
		$1,238,679 95

Liabilities.

Proprietorship Account	$1,188,620 11
Colony Farm	41,600 98
Public Hospital for Insane, New Westminster	8,458 86
	$1,238,679 95

Driveway to Hospital, New Westminster.

MENTAL HOSPITAL, ESSONDALE—BALANCE-SHEET—*Continued.*

Profit and Loss.

Salaries	$117,738 67	
Office supplies	2,879 47	
Travelling expenses	920 30	
Fuel, water, power, etc.	35,512 26	
Maintenance and repairs	23,860 37	
Furniture and fixtures	9,380 10	
Provisions	133,395 18	
Clothing	20,766 40	
Medical and surgical supplies	1,601 14	
Examinations, committals, etc.	1,107 67	
Incidentals and unforeseen	10,469 43	
Patient-labour	.....	$ 16,524 00
Collections	.....	53,740 40
Net cost of operation	.....	287,366 59
	$357,630 99	$ 357,630 99

MENTAL HOME, SAANICH—BALANCE-SHEET.

Assets.

Land		$ 12,100 00
Buildings		229,705 00
Furniture and fixtures		14,048 49
Implements		1,436 30
Airing-court		750 00
Inventories—		
Provisions	$ 112 13	
Clothing	542 90	
Medical and surgical	215 00	
Fuel	231 00	
Miscellaneous	512 00	
		1,613 03
Deficit, 1919-20 (cost of operating)		37,217 89
		$296,870 71

Liabilities.

Proprietorship Account	$295,517 86
Colony Farm	270 70
Public Hospital for Insane, New Westminster	1,082 15
	$296,870 71

Profit and Loss.

Salaries	$ 14,531 52	
Office supplies	448 35	
Travelling expenses	305 12	
Fuel, water, power, etc.	3,794 84	
Maintenance and repairs	1,438 56	
Furniture and fixtures	935 58	
Provisions	12,725 70	
Clothing	2,377 75	
Medical and surgical supplies	174 86	
Examinations, committals, etc.	559 65	
Incidentals and unforeseen	3,141 35	
Collections to Treasury	.....	$ 3,215 39
Net cost of operations	.....	37,217 89
	$ 40,433 28	$ 40,433 28

STATISTICAL TABLES.

TABLE No. 1.

Showing the Operations of the Hospitals, New Westminster, Essondale, and Saanich, during the Year 1919 up to and including March 31st, 1920, in Summary Form.

Movement of Population.	Male.	Female.	Total.	TOTAL Male.	TOTAL Female.	TOTAL Total.
In residence, New Westminster, December 31st, 1918	212	384	596			
" Essondale, December 31st, 1918	751	..	751			
" Saanich, December 31st, 1918	..	..	..			
On probation, carried forward from 1918, New Westminster	20	53	73			
" " " Essondale	22	..	22			
" " " Saanich	..	..	..			
Escaped, carried forward from 1918, New Westminster	3	..	3			
" " Essondale	6	..	6			
" " Saanich	..	..	..			
				1,014	437	1,451
Admitted during 1919-20—						
By ordinary forms	379	167	546			
By urgency forms	17	4	21			
From the Yukon	1	..	1			
Order in Council	6	..	6			
				403	171	574
Total under treatment, New Westminster, Essondale, and Saanich, January 1st, 1919, to March 31st, 1920	..	..	..	1,417	608	2,025
Discharged during period January 1st, 1919, to March 31st, 1920:						
(*a.*) From New Westminster—						
As recovered	36	53	89			
As improved	40	25	65			
As unimproved	6	20	26			
Not insane	..	..	..			
On probation and still out	14	42	56			
Escaped, but not discharged	3	1	4			
Died	34	39	73			
	133	180	313			
(*b.*) From Essondale—						
As recovered	26	..	26			
As improved	64	..	64			
As unimproved	62	1	63			
Not insane	..	..	..			
On probation and still out	31	2	33			
Escaped, but not discharged	3	..	3			
Died	57	..	57			
	243	3	246			
(*c.*) From Saanich—						
As recovered	1	..	1			
As improved	..	..	..			
As unimproved	3	..	3			
Not insane	..	..	..			
On probation and still out	1	..	1			
Escaped, but not discharged	1	..	1			
Died	2	..	2			
	8	..	8			
Total discharged from New Westminster, Essondale, and Saanich	..	..	..	384	183	567
Total in residence, New Westminster, Essondale, and Saanich, Mar. 31, 1920	..	..	..	1,033	425	1,458
New Westminster—						
Total on books, December 31st, 1918	235	437	672			
Admissions during 1919, to March, 1920	403	171	574			
Returned from Essondale	26	3	29			
Returned from Saanich	5	..	5			
				669	611	1,280
Discharged during 1919 to March, 1920	133	180	313			
Transferred to Essondale, 1919	284	34	318			
Transferred to Saanich during 1919 to March, 1920	86	..	86			
				503	214	717
Total in residence, New Westminster, March 31st, 1920	..	..	..	166	397	563

TABLE NO. 1—*Continued.*

Showing the Operations of the Hospitals, New Westminster, Essondale, and Saanich—*Continued.*

Movement of Population.	Male.	Female.	Total.	TOTAL.		
				Male.	Female.	Total.
Essondale—						
Total on books, December 31st, 1918	779	..	779			
Transferred from New Westminster, 1919 to March 31st, 1920	284	34	318			
Returned from Saanich, 1919 to March 31st, 1920	1	..	1			
				1,064	34	1,098
Discharged during 1919 to March, 1920	243	3	246			
Returned to New Westminster, 1919 to March 31st, 1920	26	3	29			
Transferred to Saanich, 1919 to March 31st, 1920	27	..	27			
				296	6	302
Total in residence, Essondale, March 31st, 1920	..	..	..	768	28	796
Saanich—						
Total on books, December 31st, 1918	..	..	..			
Transferred from New Westminster, 1919 to March 31st, 1920	86	..	86			
Transferred from Essondale, 1919 to March 31st, 1920	27	..	27			
				113	..	113
Discharged during 1919 to March 31st, 1920	8	..	8			
Returned to New Westminster, 1919 to March 31st, 1920	5	..	5			
Returned to Essondale, 1919 to March 31st, 1920	1	..	1			
				14	..	14
Total in residence, Saanich, March 31st, 1920	..	..	..	99	..	99
Total in residence, New Westminster, March 31st, 1920	166	397	563			
Total in residence, Essondale, March 31st, 1920	768	28	796			
Total in residence, Saanich, March 31st, 1920	99	..	99			
Grand total in residence, New Westminster, Essondale, and Saanich, March 31st, 1920	..	..	..	1,033	425	1,458

Daily average population	1,408.09
Maximum number present any one day	1,515.00
Minimum " " "	1,254.00
Percentage of discharges on admissions	58.71
" recoveries on admissions	20.20
" deaths on whole number under treatment	6.51

TABLE No. 2.

Showing in Summary Form the Operations of the Hospital since its Inception.

Year.	Admissions.	Discharges.		Deaths.	Number Resident at the Close of each Year.	Increase.	Decrease.	Whole Number treated.	Percentage of Recoveries to Admissions.	Percentage of Discharges to Admissions (Deaths excluded).	Percentage of Deaths to Whole Number under Treatment.
		Recovered.	Not recovered.								
1872	18	1	..	1	16	..	..	18	5.55	5.55	5.55
1873	15	10	2	5	14	..	2	31	66.66	80.00	16.12
1874	12	4	..	3	19	5	..	26	33.33	33.33	11.53
1875	29	3	3	10	32	13	..	48	10.34	26.89	20.83
1876	22	11	3	5	35	3	..	54	50.00	63.63	9.35
1877	14	4	4	3	38	3	..	49	28.57	78.57	6.12
1878	16	7	3	8	36	..	2	54	43.75	62.50	16.16
1879	18	4	1	8	41	5	..	54	22.22	27.77	14.81
1880	17	5	..	5	48	7	..	58	29.41	29.41	8.62
1881	13	5	3	5	48	..	..	61	38.46	61.54	8.19
1882	7	3	1	2	49	1	..	55	42.85	57.14	3.63
1883	8	4	1	3	49	..	..	57	50.00	62.50	5.26
1884	10	2	4	2	51	2	..	59	20.00	60.00	3.33
1885	20	5	..	5	61	10	..	71	25.00	25.00	6.94
1886	27	10	6	6	66	5	..	88	37.03	59.25	6.81
1887	36	15	5	5	77	11	..	102	41.66	55.55	4.80
1888	26	12	6	3	82	5	..	103	46.15	69.23	2.87
1889	41	14	5	4	100	18	..	123	34.15	46.34	3.25
1890	52	17	6	12	117	17	..	152	32.69	44.23	7.64
1891	49	19	4	20	123	6	..	166	38.77	46.94	11.69
1892	52	17	10	13	135	12	..	175	32.69	51.92	6.95
1893	44	14	18	14	133	..	2	179	31.81	72.72	7.60
1894	80	13	19	19	162	29	..	213	16.25	40.00	8.92
1895	62	29	11	20	164	2	..	224	46.77	64.51	8.92
1896	64	23	25	9	171	7	..	228	35.93	75.00	3.94
1897	74	20	8	14	203	32	..	246	27.03	37.83	5.69
1898	81	27	13	19	221	18	..	285	33.33	49.38	6.66
1899	101	31	32	21	234	13	..	327	30.69	62.37	6.42
1900	113	38	27	29	258	24	..	356	33.63	57.52	8.14
1901	115	40	20	25	284	26	..	377	34.78	52.17	6.63
1902	121	30	31	25	311	27	..	413	24.79	50.41	6.06
1903	139	38	37	26	349	38	..	466	27.34	53.96	5.57
1904	115	46	26	26	321	..	28	480	40.00	62.61	5.42
1905	123	43	33	27	348	27	..	505	33.33	61.78	5.34
1906	150	36*	43	28	388	43	..	552	23.03	52.06	5.04
1907	221	48	43	39	461	73	..	666	21.30	41.20	5.08
1908	230	68*	56	57	507	46	..	765	28.30	53.90	7.44
1909	232	73†	77	40	536	29	..	816	31.00	64.60	6.40
1910	280	84	82	41	595	48	..	896	30.00	59.28	4.57
1911	332	67‡	114	60	690	105	..	1,034	19.57	54.42	5.83
1912	375	74*	128	76	752	62	..	1,065	18.90	53.80	7.02
1913	380	90‖	146	67	919	167	..	1,264	22.63	62.10	5.30
1914	402	58	126	74	1,027	108	..	1,364	14.43	45.77	5.43
1915	332	83	91	89	1,090	63	..	1,437	25.00	52.41	6.19
1916	353	73†	96	80	1,205	115	..	1,527	20.68	47.87	5 24
1917	371	88	78	106	1,301	96	..	1,650	23.72	44.74	6.42
1918	375	75	95	132	1,347	46	..	1,753	20.00	45.33	7.47
Jan. 1, 1919, to Mar. 31, 1920	574	116	221	132	1,458	111	..	2,025	20.20	58.71	6.51

* Three not insane. † One not insane. ‡ Two not insane ‖ Four not insane.

Table No. 3A.

Showing Number of Admissions, Discharges, and Deaths during the Year 1919 up to and including March 31st, 1920, New Westminster.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1919.									
January	22	7	29	1	2	3	3	5	8
February	18	13	31	2	3	5	1	3	4
March	24	19	43	..	1	1	1	4	5
April	33	9	42	2	1	3	2	3	5
May	28	10	38	12	28	40	1	4	5
June	26	10	36	1	..	1	2	2	4
July	32	13	45	2	..	2	1	1	2
August	31	15	46	1	..	1	1	3	4
September	25	8	33	20	..	20	5	4	9
October	19	9	28	10	32	42	3	1	4
November	22	16	38	9	..	9	4	2	6
December	33	8	41	13	30	43	1	3	4
1920.									
January	31	12	43	2	..	2	2	1	3
February	24	11	35	1	1	2	6	2	8
March	35	11	46	6	..	6	1	1	2
Totals	403	171	574	82	98	180	34	39	73

Table No. 3B.

Showing Number of Admissions, Discharges, and Deaths during the Year 1919 up to and including March 31st, 1920, Essondale.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1919.									
January	21	..	21	..	..	..	6	..	6
February	11	..	11	17	..	17	7	..	7
March	10	..	10	3	..	3	4	..	4
April	19	..	19	7	..	7	5	..	5
May	10	..	10	3	..	3	2	..	2
June	20	..	20	3	..	3	2	..	2
July	25	..	25	6	..	6	2	..	2
August	24	.	24	18	..	18	2	..	2
September	33	24	57	4	..	4	4	..	4
October	8	..	8	12	..	12	3	..	3
November	13	2	15	13	..	13	2	..	2
December	21	1	22	44	1	45	6	..	6
1920.									
January	19	1	20	2	..	2	3	..	3
February	23	2	25	..	..	..	6	..	6
March	28	4	32	20	..	20	3	..	3
Totals	285	34	319	152	1	153	57	..	57

TABLE No. 3c.

Showing Number of Admissions, Discharges, and Deaths during the Year 1919 up to and including March 31st, 1920, Saanich.

Months.	Admissions.			Discharges.			Deaths.		
	Male.	Female.	Total.	Male.	Female.	Total.	Male.	Female.	Total.
1919.									
March	9	..	9	..	..	..	..	..	..
April	67	..	67	..	..	..	..	..	..
May	19	..	19	1	..	1	1	..	1
June	..	..	..	..	..	..	..	..	..
July	4	..	4	..	..	..	..	..	..
August	3	..	3	1	..	1	..	..	..
September	2	..	2	..	..	..	..	..	..
October	..	..	..	..	..	..	..	..	..
November	1	..	1	..	..	..	..	..	..
December	3	..	3	1	..	1	1	..	1
1920.									
January	5	..	5	..	..	..	..	..	..
February	..	..	..	..	..	..	..	..	..
March	..	..	..	1	..	1	..	..	..
Totals	113	..	113	4	..	4	2	..	2

TABLE No. 4.

Showing the Civil State of Patients admitted during the Year 1919 up to and including March 31st, 1920.

Civil State.	Male.	Female.	Total.
Married	125	109	234
Single	251	43	294
Widowed	20	16	36
Divorced	1	3	4
Unknown	6	..	6
Totals	403	171	574

Front entrance to Hospital.

TABLE No. 5.

Showing the Religious Denominations of those admitted during the Year 1919 up to and including March 31st, 1920.

Religious Denomination.	Male.	Female.	Total.
Atheist	2	1	3
Buddhist	9	1	10
Christian Science	5	3	8
Confucian	13	..	13
Greek	9	1	10
Hebrew	6	..	6
Lutheran	24	3	27
Mohammedan	1	..	1
Protestant, various denominations	228	142	370
Roman Catholic	86	18	104
Seventh Day Adventist	1	1	2
Shinto	1	1	2
Unknown	18	..	18
Totals	403	171	574

TABLE No. 6.

Showing the Degree of Education of those admitted during the Year 1919 up to and including March 31st, 1920.

Degree of Education.	Male.	Female.	Total.
Superior	13	3	16
Good	43	24	67
Common school	240	108	348
Poor	76	22	98
None	27	14	41
Unknown	4	..	4
Totals	403	171	574

TABLE No. 7.

Showing the Nationality of those admitted during the Year 1919 up to and including March 31st, 1920.

Nationality.	Male.	Female.	Total.
Australia	4	..	4
Austria	10	4	14
Brazil	1	..	1
China	18	..	18
Denmark	2	2	4
Egypt	1	..	1
England	81	59	140
Finland	7	1	8
France	1	..	1
Galicia	1	..	1
Germany	4	1	5
Greece	1	..	1
Iceland	..	1	1
India	4	..	4
Ireland	19	8	27
Italy	7	1	8
Japan	8	2	10
Macedonia	1	..	1
Newfoundland	2	1	3
New Zealand	1	.	1
Norway	3	1	4
Poland	5	1	6
Roumania	1	.	1
Russia	15	..	15
Scotland	32	14	46
Serbia	3	..	3
Sweden	14	1	15
Switzerland	1	..	1
Syria		1	1
Tasmania	1	..	1
United States	31	16	47
Wales	4	1	5
West Indies	2	..	2
Unknown	3	..	3
Canada—			
Alberta	..	3	3
British Columbia	30	13	43
Cape Breton	1	..	1
Manitoba	6	5	11
New Brunswick	4	3	7
Nova Scotia	9	3	12
Ontario	49	20	69
Prince Edward Island	1	1	2
Quebec	7	5	12
Saskatchewan	2	..	2
Canada	6	3	9
Totals	403	171	574

TABLE No. 8.

Showing what Districts contributed Patients during the Year 1919 up to and including March 31st, 1920.

Place of Residence at Time of Committal.	Male.	Female.	Total.	Place of Residence at Time of Committal.	Male.	Female.	Total.
				Brought forward	85	25	110
Abbotsford	1	1	2	Ladysmith	3	2	5
Alberta, Province of	1	..	1	Laidlaw	1	..	1
Alert Bay	1	..	1	Lucerne	2	..	2
Aldergrove	..	1	1	Lund	..	1	1
Anyox	4	..	4	Lytton	1	..	1
Ashcroft	2	1	3	Matsqui	1	..	1
B.C. Penitentiary	13	..	13	Midway	1	..	1
Bevan	1	..	1	Mill Creek	1	..	1
Big Bay	..	1	1	Milner	1	..	1
Black Pool	1	..	1	Mineola	1	..	1
Blind Bay	..	1	1	Mission	3	..	3
Britannia Mines	1	..	1	Mount Olie	1	..	1
Burnaby	1	1	2	Moyer	1	..	1
Caithness	1	..	1	Myncaster	1	..	1
Calgary, Alberta	1	..	1	Nanaimo	4	..	4
Campbell River	1	..	1	Nanoose	..	1	1
Carmangay, Alberta	..	1	1	Nass River	1	..	1
Castlegar	1	.	1	Natal	..	1	1
Chilliwack	2	1	3	Nelson	2	2	4
Clinton	2	..	2	New Westminster	14	4	18
Cloverdale	..	1	1	North Vancouver	7	9	16
Collingwood	..	1	1	Ocean Falls	..	1	1
Comox	1	..	1	Oakalla Prison Farm	3	..	3
Corbin	1	..	1	Parson	1	..	1
Courtenay	1	..	1	Pender Harbour	..	2	2
Cranbrook	1	..	1	Penticton	1	1	2
Crawford Bay	1	..	1	Phœnix	1	..	1
Dawson	1	..	1	Pitt River	1	..	1
Delta	1	..	1	Port Alberni	1	..	1
Dewdney	..	1	1	Port Coquitlam	3	..	3
Ducks	1	1	2	Port Haney	..	1	1
Duncan	1	..	1	Port Moody	..	1	1
Eholt	1	..	1	Pouce Coupe	1	1	2
Edmonds	2	..	2	Powell River	1	1	2
Elko	1	..	1	Prince Rupert	3	2	5
Enderby	1	1	2	Princeton	3	..	3
Erickson	..	1	1	Quathiaski Cove	2	..	2
Evelyn	1	..	1	Quesnel	2	..	2
Fernie	1	1	2	Revelstoke	2	..	2
Fort Langley	1	..	1	Roberts Creek	..	1	1
Fraser Mills	1	..	1	Rock Creek	..	1	1
Gibson's Landing	..	1	1	Saanich	4	1	5
Golden	1	1	2	Salmon Arm	1	1	2
Grand Forks	2	..	2	Sandwick	1	..	1
Happy Valley	1	..	1	Sidney	1	1	2
Harrop	1	..	1	Smithers	..	1	1
Hazelton	..	1	1	South Fort George	2	..	2
Hedley	1	..	1	Steveston	1	..	1
Hope	1	..	1	Sullivan Station	1	..	1
Hosmer	..	1	1	Surrey	3	..	3
Invermere	..	1	1	Texada Island	1	..	1
Joyce	..	1	1	Vancouver	191	82	273
Kamloops	10	3	13	Vanderhoof	..	1	1
Kaslo	1	..	1	Vernon	1	1	2
Kelowna	6	1	7	Victoria	35	26	61
Keremeos	3	..	3	Waldo	1	..	1
Kerrisdale	3	..	3	Yahk	1	..	1
Kildonan	1	..	1	Yakootchi Reserve	1	..	1
Kitsumgallum	1	..	1	Ymir	1	..	1
Ladner	1	..	1	127-Mile Camp (P.G.E.R.)	1	..	1
Carried forward	85	25	110	Totals	403	171	574

TABLE No. 9

Showing the Occupations of those admitted during the Year 1919 up to and including March 31st, 1920.

Occupation.	Male.	Female.	Total.	Occupation.	Male.	Female.	Total.
				Brought forward	266	126	392
Accountant	4	..	4	Mechanic	1	..	1
Actress	..	1	1	Merchant	3	..	3
Artist	1	1	2	Messenger	2	..	2
Baker	1	..	1	Miller	1	..	1
Barber	4	..	4	Milliner	..	1	1
Barrister	1	..	1	Millwright	3	..	3
Blacksmith	1	..	1	Miner	16	..	16
Boarding-house keeper	1	..	1	Moving-picture operator	1	..	1
Boiler-maker	1	..	1	Music-teacher	2	..	2
Book agent	1	..	1	News-seller	1	..	1
Book-keeper	2	..	2	None	33	32	65
Box-maker	1	..	1	Nurse	..	2	2
Brass-moulder	1	..	1	Orchardist	1	..	1
Bricklayer	1	..	1	Painter	2	..	2
Bridge-builder	1	..	1	Pedler	1	..	1
Broker	2	..	2	Photographer	1	..	1
Carpenter	12	..	12	Picture-framer	1	..	1
Charwoman	..	1	1	Pipe-fitter	1	..	1
Chauffeur	2	..	2	Plumber	1	..	1
Chemist	1	..	1	Polisher	2	..	2
Civil engineer	2	..	2	Poultryman	1	..	1
Clergyman	1	..	1	Prospector	2	..	2
Clerk	15	..	15	Railway foreman	3	..	3
Conductor	1	..	1	Rancher	7	..	7
Constable	1	..	1	Real-estate agent	1	..	1
Contractor	1	..	1	Riveter	1	..	1
Cook	7	1	8	Roofer	1	..	1
Cooper	1	..	1	Sail-maker	1	..	1
Customs officer	1	..	1	Sailor	4	..	4
Dentist	1	..	1	Saleslady	..	1	1
Dressmaker	..	3	3	Secretary	1	..	1
Electrician	5	..	5	School-teacher	1	..	1
Engineer	10	..	10	Servant	..	4	4
Engraver	1	..	1	Shipwright	2	..	2
Farmer	32	2	34	Shoemaker	1	..	1
Fireman	5	..	5	Slater	1	..	1
Fisherman	4	..	4	Soldier	9	..	9
Furrier	1	..	1	Stenographer	1	4	5
Garage-helper	2	..	2	Steward	1	..	1
Gardener	3	..	3	Stone-cutter	1	..	1
Grocer	1	..	1	Storekeeper	2	..	2
Hardware-salesman	1	..	1	Student	5	..	5
Hotelkeeper	1	..	1	Surveyor	1	..	1
Housekeeper	..	8	8	Tailor	3	..	3
Housewife	..	109	109	Teamster	3	..	3
Insurance agent	1	..	1	Telegrapher	1	..	1
Janitor	2	..	2	Trapper	2	..	2
Labourer	98	..	98	Unknown	3	..	3
Lawyer	1	..	1	Vulcanizer	1	..	1
Lineman	1	..	1	Waiter	1	..	1
Logger	20	..	20	Waitress	..	1	1
Longshoreman	4	..	4	Watchman	1	..	1
Machinist	3	..	3	Waterworks foreman	1	..	1
Mail-carrier	1	..	1	Wheelwright	1	..	1
Carried forward	266	126	392	Totals	403	171	574

TABLE No. 10.

Showing the Ages of those admitted during the Year 1919 up to and including March 31st, 1920.

Age.	Male.	Female.	Total.
Under 15 years	15	8	23
From 15 to 20 years	22	7	29
" 20 to 25 "	36	13	49
" 25 to 30 "	43	16	59
" 30 to 35 "	56	23	79
" 35 to 40 "	70	28	98
" 40 to 45 "	38	18	56
" 45 to 50 "	32	24	56
" 50 to 55 "	24	10	34
" 55 to 60 "	20	11	31
" 60 to 65 "	15	2	17
" 65 to 70 "	12	5	17
" 70 to 75 "	10	3	13
" 75 to 80 "	4	3	7
Over 80 years	2	..	2
Unknown	4	..	4
Totals	403	171	574

TABLE No. 11.

Showing the Number of Attacks in those admitted during the Year 1919 up to and including March 31st, 1920.

Number of Attacks.	Male.	Female.	Total.
First	316	131	447
Second	54	32	86
Third	9	4	13
Fourth	1	2	3
Fifth	1	1	2
Several	10	1	11
Unknown	12	..	12
Totals	403	171	574

TABLE No. 12.

Showing the Alleged Duration of Attack prior to Admission.

Duration of Attack.	Male.	Female.	Total.
Under 1 week	38	15	53
From 1 " to 1 month	126	55	181
" 1 to 3 months	50	24	74
" 3 to 6 "	28	14	42
" 6 to 12 "	21	13	34
" 1 to 2 years	28	9	37
" 2 to 5 "	16	3	19
" 5 to 10 "	10	5	15
" 10 to 15 "	9	7	16
Over 15 years	15	15	30
Unknown	62	11	73
Totals	403	171	574

TABLE No. 13.

Showing Statistics of Heredity in those admitted during the Year 1919 up to and including March 31st, 1920.

Heredity.	Male.	Female.	Total.
Paternal and maternal branches	..	..	..
Paternal branch	6	7	13
Maternal branch	10	7	17
Heredity	60	33	93
Heredity, inferred	20	33	53
Unknown	307	91	398
Totals	403	171	574

TABLE No. 14.

Showing the Alleged Cause of Attack of Insanity in those admitted during the Year 1919 up to and including March 31st, 1920.

Alleged Cause.	Male.	Female.	Total.
Alcohol	23	1	24
Arteriosclerosis	20	1	21
Cerebral hæmorrhage	2	..	2
Chorea	1	..	1
Congenital	15	..	15
Constitutional	4	.	4
Drugs	9	1	10
Epilepsy	10	3	13
Fever	1	..	1
Hemiplegia	1	1	2
Heredity	60	33	93
Heredity, ascertained	16	13	29
Heredity, inferred	20	33	53
Illness	..	2	2
Influenza	3	3	6
Menopause	..	2	2
Nephritis (chronic)	1	..	1
Neuropathic	..	4	4
Old age	18	10	28
Onanism	1	..	1
Pernicious anæmia	1	..	1
Pneumonia	..	1	1
Puerperal	..	2	2
Religion	1	..	1
Self-abuse	1	..	1
Shock	1	..	1
Solitude	2	1	3
Syphilis	39	5	44
Traumatic	8	1	9
War strain	20	..	20
Worry	16	14	30
Unknown	109	40	149
Totals	403	171	574

TABLE No. 15.

Showing the State of Bodily Health in those admitted during the Year 1919 up to and including March 31st, 1920.

Bodily Condition.	Male.	Female.	Total.
In average bodily health	272	104	376
In reduced health	98	56	154
In greatly reduced health	33	11	44
Totals	403	171	574

TABLE No. 16.

Showing the Form of Mental Disorder in those admitted during the Year 1919 up to and including March 31st, 1920.

Form of Disorder.	Male.	Female.	Total.
Acute mania	1	..	1
Cerebral lues	1	..	1
Cerebral syphilis	1	..	1
Dementia præcox	106	42	148
Epileptic insanity	13	2	15
General paresis	37	3	40
Hallucinosis	3	1	4
Hysterio mania	..	2	2
Idiocy and imbecility	39	23	62
Mania, depressive	79	66	145
Melancholia	14	1	15
Paranoia	21	5	26
Puerperal	..	1	1
Senile dementia	41	11	52
Toxic insanity	42	14	56
Traumatic insanity	5	..	5
Totals	403	171	574

TABLE No. 17A.

Showing the Number allowed out on Probation and Results during the Year 1919 up to and including March 31st, 1920, New Westminster.

Results.	Male.	Female.	Total.
Discharged recovered	13	42	55
" improved	16	21	37
" unimproved	2	14	16
Returned to Hospital	7	27	34
Still out at close of year	14	42	56
Totals	52	146	198

TABLE No. 17B.

Showing the Number allowed out on Probation and Results during the Year 1919 up to and including March 31st, 1920, Essondale.

Results.	Male.	Female.	Total.
Discharged recovered	11	..	11
" improved	21	..	21
" unimproved	13	1	14
Returned to Hospital	12	..	12
Still out at close of year	31	2	33
Totals	88	3	91

TABLE 17C.

Showing the Number allowed out on Probation and Results during the year Year 1919 up to and including March 31st, 1920, Saanich.

Results.	Male.	Female.	Total.
Discharged recovered	1	..	1
" improved	..	..	..
" unimproved	..	..	..
" not insane	..	..	..
Returned to Hospital	..	..	..
Still out at close of year	2	..	2
Totals	3	..	3

TABLE No. 18A.

Showing the Alleged Duration of Insanity prior to Admission in those discharged from New Westminster during the Year 1919 up to and including March 31st, 1920.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	14	21	35
" 1 month	37	36	73
From 1 to 2 months	5	10	15
" 2 to 3 "	6	5	11
" 3 to 6 "	..	6	6
" 6 to 12 "	2	1	3
" 1 to 2 years	2	2	4
" 2 to 3 "	2	1	3
Over 3 years	6	8	14
Unknown	8	8	16
Totals	82	98	180

TABLE NO. 18B.

Showing the Alleged Duration of Insanity prior to Admission in those discharged from Essondale during the Year 1919 up to and including March 31st, 1920.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	21	..	21
" 1 month	21	..	21
From 1 to 2 months	17	..	17
" 2 " 3 "	6	..	6
" 3 " 4 "	5	..	5
" 4 " 5 "	6	..	6
" 5 " 6 "	2	..	2
" 6 " 9 "	14	..	14
" 9 " 12 "	1	..	1
" 1 " 2 years.	7	..	7
Over 2 years	14	1	15
Unknown	38	..	38
Totals	152	1	153

TABLE NO. 18C.

Showing the Alleged Duration of Insanity prior to Admission in those discharged from Saanich during the Year 1919 up to and including March 31st, 1920.

Duration of Insanity.	Male.	Female.	Total.
Less than 1 week	1	..	1
" 1 month	1	..	1
From 1 to 2 months	..	..	..
" 2 " 3 "	..	..	..
" 3 " 6 "	..	..	..
" 6 " 12 "	..	..	..
" 1 " 2 years	..	..	..
" 2 " 3 "	..	..	..
Over 3 years	..	..	..
Unknown	2	..	2
Totals	4	..	4

TABLE NO. 19A.

Showing the Length of Residence of those discharged from New Westminster during the Year 1919 up to and including March 31st, 1920.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.
Less than 1 month	14	4	4
From 1 to 2 months	17	8	1
" 2 " 3 "	12	7	4
" 3 " 4 "	7	4	..
" 4 " 5 "	5	2	1
" 5 " 6 "	3	5	..
" 6 " 9 "	12	6	5
" 9 " 12 "	9	7	2
" 1 " 2 years	7	12	4
" 2 " 3 "	1	1	5
" 3 " 4 "	..	6	..
" 5 " 6 "	1	3	1
Totals	88	65	27

TABLE No. 19B.

Showing the Length of Residence of those discharged from Essondale during the Year 1919 up to and including March 31st, 1920.

Length of Residence.	Discharged recovered.	Discharged improved.	Discharged unimproved.
Under 1 month	..	2	1
From 1 to 2 months	3	6	..
" 2 " 3 "	4	2	3
" 3 " 4 "	4	5	2
" 4 " 5 "	..	3	4
" 5 " 6 "	..	3	2
" 6 " 9 "	2	5	9
" 9 " 12 "	3	2	5
" 1 " 2 years	7	16	15
" 2 " 3 "	..	7	7
" 3 " 4 "	3	4	3
" 4 " 5 "	..	4	6
" 5 " 6 "	..	4	..
" 6 " 7 "	..	..	2
Over 8 years	..	1	4
Totals	26	64	63

TABLE No. 19C.

Showing the Length of Residence of those discharged from Saanich during the Year 1919 up to and including March 31st, 1920.

Length of Residence.	Discharged recovered	Discharged improved.	Discharged unimproved.
Less than 1 month	..	..	..
From 1 to 2 months	..	..	1
" 2 " 3 "	..	..	..
" 3 " 4 "	..	..	..
" 4 " 5 "	..	..	..
" 5 " 6 "	..	..	..
" 6 " 9 "	..	..	..
" 9 " 12 "	..	..	..
" 1 " 2 years	1	..	..
" 2 " 3 "	..	..	..
" 3 " 4 "	..	..	1
" 5 " 6 "	..	..	1
Totals	1	..	3

TABLE No. 20A.

Record of Deaths for the Year 1919 up to and including March 31st, 1920, New Westminster.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
5467	A. G.	F.	74	..	9	12	Hypostatic pneumonia.
5339	W. G. H.	M.	25	1	1	8	Pulmonary tuberculosis.
5723	P. W. C.	M.	34	..	1	5	Cerebral syphilis.
3174	V. D.	F.	36	7	..	..	Status epilepticus.
5603	J. F.	M.	49	..	5	4	Exhaustion of general paralysis.
5705	J. K.	F.	33	..	2	6	Exhaustion of general paralysis.
5759	A. C.	F.	44	..	..	2	Bronchopneumonia.
5003	J. J.	F.	59	2	..	21	Mild carditis.
5762	A. C.	F.	54	..	..	8	Exhaustion of acute mania.
4868	H. C.	F.	61	2	6	22	Mild carditis.
5791	A. Mc.	M.	44	..	..	5	Cerebral syphilis.
2685	A. O.	F.	83	8	6	21	Exhaustion of terminal dementia.
5789	M. A. C.	F.	37	..	..	22	Cerebral hæmorrhage.
5641	L. E. D.	M.	18	..	5	6	Exhaustion of status epilepticus.
5814	M. A.	F.	65	..	..	3	Hypostatus pneumonia.
5833	J. A.	F.	8	..	..	6	Tubercular adenitis.
3492	C. R.	F.	63	12	6	9	Cerebral embolus followed by hypostatic pneumonia.
5446	T. G. W.	M.	54	1	..	27	Acute cellulitis.
5562	M. E. T.	F.	70	..	8	16	Exhaustion of senile dementia.
2670	F. F.	F.	46	8	9	..	Pulmonary tuberculosis.
3200	R. G.	F.	35	7	1	24	Pulmonary tuberculosis.
5852	H. P.	M.	37	..	..	16	Exhaustion of acute mania.
5825	F. C.	M.	20	..	1	16	Suicidal.
1911	F. H. D.	F.	43	12	1	21	Exhaustion of epileptic dementia.
1564	F. T.	F.	77	14	7	1	Cerebral hæmorrhage.
4326	A. M. W.	F.	30	4	4	3	Hæmoptosis.
5907	M. S.	F.	45	..	..	12	Exhaustion of acute mania.
3967	G. B. P.	M.	13	5	3	7	Phyostatic pneumonia.
5441	I. M.	F.	37	1	3	..	Pulmonary tuberculosis.
5769	W. A.	M.	59	..	4	14	Pernicious anæmia.
5913	M. T.	F.	67	..	1	6	Carcinoma of hepatic duct with biliary toxæmia.
4807	J. C.	F.	75	3	1	7	Exhaustion of senile dementia.
5875	T. P. W.	M.	40	..	3	.	Exhaustion of general paresis.
5997	J. O.	M.	60	..	..	14	Exhaustion of pernicious anæmia.
5085	E. E. K. L.	F.	17	2	4	13	Marasmus from stricture æsophagus.
1584	H. C.	F.	71	14	7	27	Carcinoma of the breast.
5993	K. A.	F.	40	..	1	2	Suicide by strangulation.
6025	A. J. K.	F.	77	..	..	23	Exhaustion of cellulitis.
2062	F. B.	M.	55	11	8	20	Cerebrospinal meningitis.
6023	H. E. G.	M.	65	..	..	23	Exhaustion of cerebral hæmorrhage
5935	A. M. C.	F.	28	..	1	18	Exhaustion of mania.
5994	J. H.	M.	78	..	1	27	Cerebral hæmorrhage.
1313	M. P.	F.	62	16	10	20	Lung abscess.
3587	R. A. M.	F.	33	6	6	25	Cardis renal disease.
5568	O. T. W.	M.	33	1	1	26	Exhaustion of status epilepticus
4051	F. B.	M.	58	5	4	27	Carcinoma.
5936	T. H. H.	M.	30	..	3	12	Exhaustion of general paresis.
5826	E. R. P.	M.	71	..	6	24	Exhaustion of senile dementia.
5768	F. H. R.	M.	65	..	8	28	Exhaustion of senile dementia.
5934	E. W.	F.	68	..	4	14	Exhaustion of senile dementia.
5896	B. Mc.	F.	50	..	5	28	Mild carditis.
6003	S. J.	F.	56	..	3	9	Exhaustion of mania.
6109	J. L. K.	M.	70	..	..	12	Exhaustion of mania.
4694	G. B.	M.	36	..	8	20	Pulmonary tuberculosis.
5713	J. B.	M.	77	..	11	4	Exhaustion of inanition.
5476	J. L.	M.	56	..	7	28	Exhaustion of general paresis.
6153	G. J.	M.	34	..	..	2	Maniacal exhaustion.
6091	D. H.	F.	38	..	2	16	Strangulation, self-inflicted.
5850	L. M. K.	F.	40	..	8	15	Exhaustion of general paresis.
6147	H. H.	F.	50	..	..	24	Exhaustion of acute mania.

TABLE No. 20A—*Continued.*

Record of Deaths for the Year 1919 up to and including March 31st, 1920, New Westminster—*Continued.*

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
6183	W. V. M.	M.	60	..	..	16	Exhaustion of inanition.
6206	E. A. G.	F.	24	..	..	2	Exhaustion and collapse.
6136	G. B.	M.	72	.	2	9	Exhaustion of inanition.
5941	L. L.	M.	26	..	7	10	Pulmonary tuberculosis.
6222	M. L. V.	F.	51	..	...	8	Mild carditis.
6192	J. F. R.	M.	68	..	1	5	Cerebral hæmorrhage.
5923	G. S.	M.	67	..	8	12	Exhaustion of senile dementia.
6010	H. P. A. S.	M.	42	..	6	8	Suicide by drowning.
6194	J. L.	M.	30	..	1	13	Exhaustion of general paresis.
5510	P. B. M.	M.	38	1	9	8	Exhaustion of terminal dementia.
6228	A. L. M.	F.	39	.	2	13	Exhaustion of imbecility.
6187	W. H. W.	M.	75	..	2	18	Exhaustion of senile dementia.
5539	E. L.	F.	71	1	7	4	Cerebral embolism.

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TABLE No. 20B.

Record of Deaths for the Year 1919 up to and including March 31st, 1920, Essondale.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
5536	A. L.	Male.	65	..	6	8	Exhaustion of senile dementia.
4775	A. W. M.	"	48	2	8	13	Cerebral hæmorrhage.
4689	J. G. S.	"	65	2	11	12	Myocarditis.
5000	P. D. B.	"	18	2	..	25	Cerebral hæmorrhage.
4518	J. W. W. K.	"	18	3	6	7	Pulmonary tuberculosis.
3475	G. B.	"	45	6	2	14	Pulmonary tuberculosis.
4696	F. A. J.	"	50	2	11	10	Cerebral hæmorrhage.
846	Y. T. H.	"	80	20	4	7	Bronchopneumonia.
5117	J. McV.	"	38	1	9	19	Cerebral hæmorrhage.
5659	A. G.	"	40	..	4	2	Pulmonary tuberculosis.
5273	A. W.	"	50	1	4	16	Cerebral hæmorrhage.
1636	R. S.	"	78	13	8	27	Myocarditis.
5506	P. R. Q.	"	56	..	9	16	Cerebral hæmorrhage.
4558	W. G. F.	"	39	3	5	.	Exhaustion of general paresis.
4699	C. E. P. C.	"	77	3	..	7	Myocarditis.
3884	D. McL.	"	41	5	3	5	Tuberculosis.
4968	B. V.	"	85	2	3	26	Exhaustion of senile dementia.
2089	M. S.	"	61	11	2	10	Pulmonary tuberculosis.
3528	F. W.	"	66	6	2	26	Lobar pneumonia.
3826	C. S.	"	73	5	5	28	Myocarditis.
2314	W. L.	"	51	10	2	25	Pulmonary tuberculosis.
4325	J. V.	"	26	4	3	3	Pulmonary tuberculosis.
5741	M. S. M.	"	60	..	4	8	Cerebral hæmorrhage.
1035	J. M.	"	70	18	11	7	Exhaustion of terminal dementia.
3356	M. C.	"	60	6	11	3	Cerebral hæmorrhage.
4924	G. W. B.	"	17	2	8	16	Pulmonary tuberculosis.
5839	J. P.	"	46	..	3	17	Cerebral hæmorrhage.
2777	C. A. B.	"	59	8	8	4	Myocarditis.
5911	W. R. P.	"	38	..	2	16	Cerebral hæmorrhage.
5981	D. H. R.	"	54	..	1	10	Cerebral hæmorrhage.
2745	C. W.	"	45	8	10	29	Pulmonary tuberculosis.
5072	H. C. S.	"	23	2	5	13	Pulmonary tuberculosis.
5904	W. L. A.	"	78	..	3	28	Exhaustion of senile dementia.
5858	W. Y. G.	"	42	..	5	1	Cerebral hæmorrhage.
5952	F. S.	"	75	..	3	11	Myocarditis.
5974	K. B.	"	51	..	3	11	Exhaustion of general paresis.
5286	E. M.	"	38	2	..	8	Exhaustion of general paresis.
5274	J. H.	"	52	2	..	26	Exhaustion of senile dementia.
6044	T. A. R.	"	42	..	2	19	Cerebral hæmorrhage.
5105	H. R.	"	57	2	7	19	Cerebral hæmorrhage.
4698	A. L.	"	83	3	9	13	Cerebral hæmorrhage.
5663	G. M.	"	65	1	1	27	Exhaustion of general paresis.
5136	L. K.	"	64	2	6	22	Exhaustion of acute delirious mania.
1396	F. J.	"	68	16	6	21	Melanotic carcinomatosis.
5722	B. S. S.	"	22	1	..	13	Static pneumonia.
1053	I. R.	"	54	19	6	..	Myocarditis, pulmonary embolism.
5486	J. V.	"	74	1	9	23	Bronchopneumonia.
5373	W. E. J.	"	75	2	..	22	Exhaustion of senile dementia.
5414	T. N.	"	62	1	11	25	Exhaustion of general paresis.
636	J. H.	"	78	24	7	26	Bronchopneumonia.
6062	G. D.	"	34	..	5	6	Streptococcic meningitis.
378	T. D.	"	75	29	6	1	Empyema, left lung abscessed.
4847	J. P.	"	80	3	7	16	Bronchopneumonia.
4678	G. D.	"	79	4	..	19	Bronchopneumonia, erysipelas.
3837	J. P.	"	36	6	4	25	Chronic ulcerative tuberculosis, pulmonary and general.
1698	P. L.	"	88	14	3	18	Bronchopneumonia.
5501	G. D. L.	"	59	1	10	14	Exhaustion of general paresis.

TABLE No. 20c.

Record of Deaths for the Year 1919 up to and including March 31st, 1920, Saanich.

Register No.	Initials.	Sex.	Age.	Time in Hospital.			Certified Cause.
				Years.	Months.	Days.	
5605	F. E. H.	Male.	50	1	4	6	Sarcoma of liver.
5320	H. H.	"	34	1	5	27	Suicidal.

TABLE No. 21A.

Showing Work done by Patients at New Westminster during the Year 1919.

	Days.		Days.
Auto-truck	456	Laundry	2,496
Baker	1,237	Lawns	1,755
Carpenter	1,202	Painter	1,466
Chicken-house	792	Piggery	2,493
Dining-room	6,858	Plasterer	127
Engineer	912	Plumber	429
Farmer	8,338	Porter	378
Florist	295	Scullery	1,304
Gardener	4,835	Shoemaker	1,308
Gate	451	Tailor	716
Kitchen	3,021	Teamster	400
Laboratory	456	Ward-work	11,982

TABLE No. 21B.

Showing Work done by Patients at Essondale during the 15 Months ending March 31st, 1920.

	Days.		Days.
Bake-shop	1,699	Janitor-work	15,255
Carpenter	1,403	Kitchens	3,772
Civil engineer	1,458	Land-clearing	6,583
Dining-room	9,583	Laundry	7,979
Dykes and drains	8,669	Mason	1,770
Electrician	375	Painter	2,526
Engineer	2,348	Plasterer	3,636
Excavation for Boys' Industrial School	1,017	Poultry	1,207
Farm and nursery	16,524	Scullery	2,132
Grade, lawns and roads	10,868	Stables and teams	1,823
General outdoor work	3,050	Ward-work	34,644

TABLE No. 22.

Articles made by Female Patients, New Westminster, to March 31st, 1920.

Aprons	393	Pillow-slips	655
Bureau-covers	100	Sheets	613
Chemises	460	Skirts	24
Curtains, pairs	81	Table-cloths	117
Dresses, gingham	209	Table-napkins	60
" night	96	Tea-towels	360
Handkerchiefs	481	Hand-towels	559
Mats, rag	10	Roller-towels	536
Neckties	332	Tray-cloths	210
Petticoats	137		

Greenhouse, New Westminster.

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TABLE No. 22—*Continued.*

Made for Nurses.

Aprons	239	Cuffs, pairs	118
Caps	122	Dresses	72

Repairs for Male Patients, New Westminster, to March 31st, 1920.

Aprons	236	Pillow-slips	133
Blankets, wool	227	Sheets	1,505
„ canvas	12	Shirts	3,280
Coats, white duck	74	„ under	3,440
„ serge	...	Socks, pairs	18,280
Pants, serge	...	Sweaters	49
Drawers	2,958	Table-cloths	256
Bed-spreads	483	Towels, hand	131
Bed-ticks	96	„ roller	150
Overalls, pairs	59	Pillow-ticks	...

Mending done for Female Patients, New Westminster, to March 31st, 1920.

Aprons	305	Pillow-slips	123
Blankets, wool	309	Sheets	1,285
„ canvas	67	Skirts	1,280
Blouses	258	Bed-spreads	322
Chemises	1,236	Table-cloths	235
Drawers, pairs	2,190	Towels, hand	136
Dresses, gingham	1,848	„ roller	89
„ serge	550	Bed-ticks	188
„ night	834	Pillow-ticks	37
Hose, pairs	12,292	Under-vests	1,720

Repairs for Nurses.

Aprons	412	Dresses	255

Supplies received from Home Farm, New Westminster, to March 31st, 1920.

Chickens, dressed	406 lb.	Eggs	1,105 doz.
Ducks, dressed	246 „		

Garden Produce, New Westminster, 1919 (Fruits).

	Lb.		Lb.
Apples	45,020	Rhubarb	4,946
Strawberries	2,333	Pears	1,025
Raspberries	466	Cherries	778
Gooseberries	295	Prunes	145
Red currants	2,021	Plums	1,345
Black currants	95		

Garden Produce, New Westminster, 1919 (Vegetables, etc.).

Beets	4,125 lb.	Onions, green	300 lb.
Carrots	33,140 „	„ cooking	4,394 „
Cabbage (approx.)	6,805 „	Radish	... „
Celery	414 heads.	Sweet corn	295 dozen.
Cucumbers	1,387 lb.	Tomatoes, green	1,400 lb.
Horse-radish	75 „	„ ripe	3,034 „
Lettuce	174 dozen.	Turnips	1,240 „
String beans	340 lb.	Spinach	... „
Parsley	36 bunches.	Vegetable marrow	1,012 „
Pumpkins	1,666 lb.	Swiss chard	3,695 „
Peas	765 „	Cauliflower	85 „
Potatoes, early	3,740 „	Parsnips (approx.)	9,520 „
„ late	... „		

TABLE No. 22—*Continued.*

Fruit put up at New Westminster, 1919.

	Quarts.		Quarts.
Crab-apples	48	Plums	50
Currants, black	18	Pears	34
„ red	10	Rhubarb	152
Gooseberries	66	Strawberries	116
Prunes	35		

Pickles put up, 1919.

	Quarts.
Tomatoes	90

Articles made by Plumber and received into Stores, New Westminster, 1919.

9 soup-pails, 10" x 10".
2 tin dippers, 1 gal. each.
2 tea-cans, large, about 4 gals. each.
2 stew-pans, large.

Articles made for Essondale by New Westminster Institute.

Aprons	18	Table-cloths	100
Curtains, pairs	24	Sheets	6
Pillow-slips	8	Tea-towels	12
Table-covers	12		

Commodities supplied New Westminster Institution by Essondale.

Material for Tailor-shop	$4,334 66
Material for Shoemaker-shop	451 74
Bedding	242 49
Miscellaneous furniture	449 23
Medical and surgical supplies	159 82
Janitors' supplies, etc.	132 15
7½ cords wood	45 00
Sundries	253 70
20,740 lb. ice	110 55
Total	$6,179 34

Tailor's Report for Year 1919 to March 31st, 1920.

Uniforms made for Essondale Institution—		
93 suits at $32	$2,976 00	
3 suits at $35	105 00	
16 suits at $45	720 00	
73 pairs of pants at $8	584 00	
3 pairs of pants at $9	27 00	
29 pairs of pants at $12.40	359 60	
		$4,771 60
Patients' clothing, etc.—		
247 uniform suits at $16.50	$4,075 50	
22 uniform pants at $5.50	121 00	
12 pairs boys' pants at $3	36 00	
		4,232 50
Repairs to clothing, Essondale Institution—		
2,028 coats at 50 cents	$1,014 00	
1,499 vests at 30 cents	449 70	
3,876 pants at 40 cents	1,550 40	
		3,014 10
Miscellaneous work at $31	$ 31 00	
18 canvas blankets at $6.50	117 00	
		148 00
Total for Essondale		$ 12,166 20

TABLE No. 22—*Continued.*

Tailor's Report for Year 1919 to March 31st, 1920—Continued.

Brought forward			$ 12,166 20
Uniforms for Saanich—			
8 suits at $32	$ 256 00		
4 pairs pants at $8	32 00		
1 pair pants at $9	9 00		
		$ 297 00	
Stock clothing—			
25 suits at $16.50	$ 412 50		
30 pairs pants at $5.50	165 00		
9 canvas blankets at $6.50	58 50		
19 bed-ticks (labour only)	6 65		
12 coats at $11	132 00		
1 combination suit at $10.50	10 50		
		785 15	
Total for Saanich			1,082 15
Uniforms made for City Institution—			
38 suits at $32	$1,216 00		
17 suits at $45	765 00		
7 pairs pants at $12.40	86 80		
4 suits at $35	140 00		
41 pairs pants at $8	328 00		
2 pairs pants at $9	18 00		
		$2,553 80	
Patients' clothing, etc.—			
83 coats at $11	$ 913 00		
2 coats for piggery at $4	8 00		
165 pairs pants at $5.50	907 50		
10 pairs boys' pants at $2.50	25 00		
4 sets dental-chair covers at $2	8 00		
2 combination suits at $10.50	21 00		
36 canvas blankets at $6.50	234 00		
34 bed-ticks (labour only)	11 90		
36 pillow-ticks (labour only)	3 60		
4 camisoles at $4	16 00		
		2,148 00	
Miscellaneous		122 75	
Repairs to clothing, City Institution—			
286 coats at 50 cents	$ 143 00		
105 vests at 30 cents	31 50		
547 pants at 40 cents	218 80		
		393 30	
Total for City Institution			5,217 85
Grand total			$ 18,466 20

Statement of Tailor-shop, 15 Months ending March 31st, 1920.

Credits—			
Supplied to Essondale—			
Uniforms for attendants	$4,771 60		
Clothing for patients	4,232 50		
Repairs for patients	3,014 10		
Miscellaneous work	148 00		
Carried forward			$12,166 20

TABLE No. 22—*Continued.*

Statement of Tailor-shop, 15 Months ending March 31st, 1920—Continued.

Brought forward		$12,166 20	
Supplied to New Westminster—			
Uniforms for attendants	$2,553 80		
Clothing for patients	2,148 00		
Repairs for patients	393 30		
Miscellaneous work	122 75		
		5,217 85	
Supplied to Saanich—			
Uniforms for attendants	$ 297 00		
Clothing, etc., for patients	785 15		
		1,082 15	
Sale of cuttings (rags)		48 25	
Material on hand, March 31st, 1920		1,623 03	
			$ 20,137 48
Debits—			
Stock on hand, December 31st, 1918		$ 753 60	
Material purchased, New Westminster and Essondale		12,104 06	
Salaries—			
Mr. Beggs	$1,515 00		
Mr. French	1,440 00		
Mrs. Huntely	855 00		
Miss Pennington	627 00		
Mrs. Black	280 87		
Mrs. Orr	30 54		
Mrs. Kerr	280 00		
Mrs. Derby	328 00		
		5,356 41	
Electric power		75 00	
Electric light		37 50	
Profit on operating		1,810 91	
			$ 20,137 48

Shoemaker's Report, 15 Months ending March 31st, 1920.

New work for New Westminster (house)—			
83 pairs of men's boots		$ 691 50	
9 pairs of ladies' boots		49 00	
182 pairs of men's slippers		528 50	
			$ 1,269 00
Repairs for New Westminster—			
307½ pairs men's boots		$ 487 25	
150 pairs ladies' boots		176 85	
8 pairs men's slippers		6 35	
			670 45
Repairs for Essondale—			
929 pairs men's boots		$1,407 25	
433 pairs men's slippers		412 45	
31 pairs boys' boots		47 50	
			1,867 20
Specials made for Essondale—			
6 pairs men's boots		$ 55 00	
3 pairs men's slippers		12 00	
10 pairs boys' slippers		20 00	
			87 00
			$ 3,893 65

Scenes from Farm and Nursery.

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TABLE No. 22—*Continued.*

Statement of Shoemaker, 15 Months ending March 31st, 1920.

Credits—		
Supplied to New Westminster—		
New work	$1,269 00	
Repairs, etc.	670 45	
		$ 1,939 45
Supplied to Essondale—		
New work	$ 87 00	
Repairs, etc.	1,867 20	
		1,954 20
Stock on hand, March 31st, 1920		317 94
		$ 4,211 59
Debits—		
Salary of shoemaker		$ 1,420 00
Material purchased, New Westminster	$1,775 38	
„ „ Essondale	451 74	
		2,227 12
Light and power used		42 50
Stock on hand, December 31st, 1918		331 63
Profit on operating		190 34
		$ 4,211 59

PROVINCIAL COLONY FARM, ESSONDALE.

BURSAR'S REPORT.

ESSONDALE, B.C., March 31st, 1920.

The Medical Superintendent,
Provincial Mental Hospitals, Essondale, B.C.

SIR,—I beg to submit herewith Balance-sheet and Profit and Loss Statements, together with detailed accounts of each departmental heading, covering financial accounting period of fifteen months from January 1st, 1919, to March 31st, 1920. The additional three months (January 1st to March 31st) were added to our usual year in order that the Colony Farm accounting period would be similar to that of the Government fiscal year ending March 31st. The attached statements were taken from books kept at head office of the institution from details supplied daily from various departments.

The farm operations for the present year show a profit of $5,693.18 in fifteen months after providing for all losses by deaths, etc., against $1,436.29 for a twelve-months period in 1918. I would, however, like to point out that this fifteen months covers two unproductive periods in the winter—namely, January, February, and March of both years (1919 and 1920), when feeding of stock and all expenditures are exceptionally heavy. The whole period under review was characterized as one of exceedingly high prices for both labour, feed, and material.

The farm remitted to Provincial Treasury in fifteen months $12,757.06, which compares favourably with 1918 collections of $6,964.80.

The produce supplied to the Mental Institutions amounted to $82,407.97, to which must be added shrubs, trees, etc., valued at $5,621.35, which were supplied Essondale Institution, public schools of British Columbia, and other Government departments, making a productive value of $89,029.32, exclusive of what the farm produced for its own use, and not taking into account the great benefit derived from the outdoor occupation of patients.

Milk production for fifteen months under review was 797,171.7 lb., costing $40,771.06, or 51 cents per gallon, which compares with 1918 twelve months production of 609,021.2 lb., costing $25,016.23, or 41 cents per gallon. The increase of 10 cents per gallon is largely due to the high cost of both feed and labour.

Horse-labour shows in this period of fifteen months production of 55,603 hours, costing $21,496.67, or at the rate of 38⅝ cents per horse-hour, compared with 46,154 hours, costing $10,780.21, or 23⅓ cents per horse-hour, in 1918. This increase is also due to higher prices of feed and labour.

Bills receivable for fifteen months show a reduction on the figures of twelve months in 1918, and I am pleased to report we have carried through this year's operations without incurring any bad book debts. Our operating expenditures from the Treasury supply votes for both salaries and expenses were $83,576.44 for fifteen months, which figures about $1,500 increase per month over the former year, due to adjustments in salaries of employees and increase in all other commodities.

Crops departments all show nice profits, especially potatoes, hay, and oats.

In our dairy operations we have charged the institutions milk on a sliding scale, the idea being to keep it at practically cost and to increase according to the rise in feed. In computing the year's operations, however, it will be noticed we have supplied at a little less than cost, which shows on the Profit and Loss Statement as a loss in operations of $1,081.66. Other losses in our Live Stock Department are mostly due to animals destroyed or died, especially in the Bull Department, which unfortunately suffered the loss of a valuable animal, "Sir Ormsby Maid Champion," a promising young bull which died from lead-poisoning.

Our maintenance loss, which included administration, repairs, and renewals, and general expenses, is heavy as usual, showing an increase over previous years on account of increased salaries and the higher cost of everything purchased under these headings; and as the farm

is a governmental one, connected with a public institution, open at all times to inspection and criticism, it necessarily should be kept at a high standard of efficiency and appearance.

All of which is respectfully submitted.

G. S. MACGOWAN,
Bursar.

BALANCE-SHEET, COLONY FARM AND BRANCHES.

JANUARY 1ST, 1919, TO MARCH 31ST, 1920.

Assets.

		Assets.	Liabilities.
Land Account—			
Colony Farm	$153,734 81		
Wilson Annex	41,139 05		
		$194,873 86	
Buildings		157,520 62	
Fencing, pavement, roads, etc.		56,534 46	
Equipment (wagon tools, implements, etc.)		24,424 57	
Live-stock—			
Bulls, as per inventory (3 head)	$ 3,150 00		
Cows, as per inventory (76 head)	30,075 00		
Young cattle, as per inventory (70 head)	9,433 19		
Brood mares, as per inventory (7 head)	13,968 50		
Work-horses, as per Inventory (24 head)	8,257 65		
Young horses, as per inventory (6 head)	4,114 20		
Sheep, as per inventory (154 head)	3,679 00		
Hogs, as per inventory (211 head)	5,566 60		
Poultry, as per inventory (1,107 birds)	1,911 00		
		80,155 14	
Inventories—			
Poultry-feed on hand	$ 90 22		
Feed and produce, as per inventory	3,761 15		
Dairy cream in vat, 72 lb.	21 60		
Nursery and truck-garden	41,459 05		
		45,332 02	
Accounts receivable—			
Mental Hospital, Essondale	$ 64,564 09		
Public Hospital for Insane, New Westminster	62,324 67		
Boys' Industrial School, Coquitlam	164 90		
Mental Home, Saanich, Colquitz	270 70		
Grade Account	14,097 44		
Provincial public schools	9,900 30		
Government Department purchases	6,193 55		
Public works, Essondale	1,221 21		
Game Department, Elk Account	271 77		
Game Department, feeding birds	14 30		
Sundry accounts receivable	699 95		
		159,722 88	
Notes receivable		1,509 57	
Growing crops (Apportionment Acccount)		4,936 44	
Carried forward		$725,009 56	

BALANCE-SHEET, COLONY FARM AND BRANCHES—*Continued.*

Liabilities.

		Assets.	Liabilities.
Brought forward		$725,009 56	
Surplus Account (Proprietorship Account)	$802,335 95		
Deficit Account, Colony Farm, 1914 to 1918 .... $39,376 44			
Deficit, Sunbury Account, 1916 to 1917 ..... 9,655 60			
	49,032 04		
		.....	$753,303 91
Profit for 15 mos. ending March 31st, 1920 (exclusive of patient-labour)		.....	5,693 18
Deficit, patient-labour, value for year 1918	$ 16,340 00		
Deficit, patient-labour, value for years 1919-20	18,348 00		
		34,688 00	
Suspense Account		.....	460 49
Accounts payable, Up Hill Account		.....	239 98
		$759,697 56	$759,697 56

PROFIT AND LOSS STATEMENT.

YEAR ENDING MARCH 31ST, 1920 (15 MONTHS).

Departments.	Operations.					Acreage.	Costs.
	Debits.	Credits.	Loss (Deaths).	Loss.	Gain.		
Dairy and herds	$ 40,781 06	$ 39,699 40	.....	$ 1,081 66	.....	....	Cost of milk, 51 cents per gallon.
Bulls	4,483 80	.....	$3,898 22	257 58	.....	....	
Bull Service Account	426 88	70 00	.....	356 88	.....	....	
Cow Account, sales and deaths	7,748 73	6,577 46	.....	1,171 27	.....	....	
Young cattle, sales and deaths	4,638 03	8,621 40	.....	.....	$ 3,983 37	....	
Young horses, sales and deaths	857 00	200 00	.....	657 00	.....	....	
Work-horses, sales and deaths	2,918 23	235 00	600 00	2,083 23	.....	....	
Work-horse Labour Account	21,752 17	22,496 70	.....	.....	744 53	....	Cost, 38 cents per horse-hour.
Sheep Account	5,695 35	4,672 27	.....	1,023 08	.....	....	
Hog Department	19,246 29	24,728 00	.....	.....	5,481 71	....	
Poultry Department	6,055 22	7,617 13	.....	.....	1,561 91	....	
Truck garden and nursery	48,179 22	62,790 78	.....	.....	14,611 56	....	
Crops, potatoes	3,116 58	10,666 15	.....	.....	7,549 57	34.91	Yield per acre, 10.18 tons; cost a ton, $8.76.
„ hay	1,347 52	4,570 75	.....	.....	3,223 23	70.45	Yield per acre, 2.16 tons; cost a ton, $8.86.
„ onions	21 20	97 00	.....	.....	75 80	1.00	
„ roots (carrots, mangels, and turnips)	1,427 80	1,627 70	.....	.....	199 90	22.16	Yield per acre, 10.45 tons; cost a ton, $6.15.
„ wheat	77 00	264 75	.....	.....	187 75	4.00	Yield per acre, 1.557 lb.; cost a ton, $24.60.
„ peas	84 60	176 50	.....	.....	91 90	2.00	Yield per acre, 1,765 lb.; cost a ton, $48.
„ oats	3,124 75	5,035 84	.....	.....	1,911 09	98.25	Yield per acre, 1,507 lb.
„ ensilage	2,609 25	2,836 74	.....	.....	227 49	52.89	
„ beans	87 00	107 50	.....	.....	20 50	3.00	
Pasturage	10 40	941 75	.....	.....	931 35	71.80	
Shrinkage and Rot Account	852 21	.....	.....	852 21	.....	....	
Straw-baling, Ladner	1,707 42	1,414 80	.....	292 62	.....	....	
Tractor	1,519 93	1,777 50	.....	.....	257 57	....	
Sunbury Provision Account	.....	1,230 72	.....	.....	1,230 72	....	
Prize-money receipts	.....	357 00	.....	.....	357 00	....	
Maintenance and administration	24,151 90	.....	.....	24,151 90	.....	....	
Exhibition expenses	528 12	.....	.....	528 12	.....	....	
	$203,447 66	$208,812 84	$4,498 22	$32,455 55	$42,646 95	360.46	
					32,455 55		
					$10,191 40		Profit for farm (exclusive of deaths and patient-labour).
					4,498 22		Loss from deaths of stock.
					$ 5,693 18		Profit for farm after deductions.

Patient-labour	$18,348 00
Profit from farm	5,693 18
Loss after deducting patient-labour	$12,754 82

DAIRY AND HERDS DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Expenses.

Total expenses for 15 months	$40,771 06	
Jan. 1, 1919. Inventory of cream	10 00	
		$ 40,781 06

Production.

Dairy produce supplied institutions and other departments, 15 months...	$39,677 80	
March 31, 1920. Inventory of cream	21 60	
		39,699 40
Loss in dairy, 15 months		$ 1,081 66

PRODUCTION AND COSTS ACCOUNT, MARCH 31ST, 1920.

Expenses for 15 Months.

			Production. Lb. Milk.
Dairy—			
Salaries and upkeep	$2,783 80		
Board of employees	817 20		
Coal	403 07		
Sundries	64 84		
		$ 4,068 91	
Test cows—			
Salaries and upkeep	$3,624 71		
Board of employees	1,584 00		
Feed	8,234 18		
Sundries	50 11		
		13,493 00	287,801.40
T.B. herd—			
Salaries and upkeep	$ 741 32		
Feed Account	2,243 60		
Board of employees	522 00		
Horse-labour	225 00		
		3,731 92	69,526.30
General herd—			
Salaries and upkeep	$ 5,071 88		
Feed	12,697 85		
Board of employees	1,675 80		
Pasturage	406 00		
Horse-labour	339 20		
		20,190 73	439,844.01
		$41,484 56	
Less allowance for manure		713 50	
		$40,771 06	
Jan. 1st, 1919. To inventory of cream on hand		10 00	
		$40,781 06	797,171.71

A quantity of 797,171.71 lb. of milk was produced at an average cost of 51 cents per gallon.

DAIRY AND HERDS DEPARTMENT—*Continued.*

MILK PRODUCTION, JANUARY 1ST, 1919, TO MARCH 31ST, 1920.

1919.	Production. Lb.	Cost.
January	50,032.50	$ 2,912 12
February	45,952.40	2,711 77
March	54,614.00	2,849 47
April	57,365.00	2,634 48
May	61,079.00	3,149 67
June	58,330.00	2,177 15
July	53,190.50	1,898 68
August	56,387.10	2,399 91
September	53,638.00	2,531 72
October	54,141.11	2,744 80
November	50,890.20	2,651 25
December	48,857.90	2,681 61
1920.		
January	52,212.50	3,401 54
February	50,206.90	3,069 29
March	50,274.60	2,957 60
Totals	797,171.71	$40,771 06

Average cost of production, 51 cents per gallon.

BULL DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Sir Ormsby Maid Champion	$3,898 22	.....	Died.
Transferred from Bull Depreciation Account	.....	$328 00	
Reduction on valuation of bulls by Farm Superintendent	585 58	.....	
	$4,483 80	$328 00	
	328 00		
Loss	$4,155 80		

BULL SERVICE ACCOUNT—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

By Fees—Mr. Allen, $2; Mr. Barbour, $2; Mr. Flowers, $2; Mr. Eskola, $2; Mr. Eskola, $2; Mr. Gauther, $2; Mr. Wilcox, $2; Mr. Eskola, $2; Mr. Gough, $2; Mr. Kala, $2; Mr. Lard, $2; Mr. Lefleur, $2; Mr. Pare, $2; Mr. Cunningham, $2; Mr. Gauther, $2; Mr. Gough, $2; Mr. Fellows, $2; Mr. Newman, $2; Mr. Murrin, $2; B.C. Golf Club, $2; Mr. Lefleur, $2; Mr. Eskola, $2; Mr. Vasser, $2; Mr. Lehman, $2; Mr. Lefleur, $2; Mr. Breholt, $2; Mr. Eskola, $2; Mr. Vasser, $2; Mr. Costello, $2; Mr. Naples, 2; Mr. Lefleur, $2; Mr. Naples, $2; Mr. Gauther, $2 ..... $ 70 00

Expenses.

To Operating Account for 15 months 426 88

Loss $356 88

MATURE COW DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

		Name of Animal.	Asset Value.	Selling-price.	Remarks.
1919.					
Feb. 11.	To	Nathalie Clothilde Perfection	$ 609 49	.....	Destroyed.
„ 11.		Colony Posch Aaggie Segis	232 47	.....	„
Mar. 6.		Pauline Colantha Jenson	700 00	.....	„
„ 6.		2 hides sold	.....	$ 23 28	
„ 6.		Colony Minnie Korndyke	250 00	55 70	Killed.
„ 6.		Koba DeKol Pride	206 64	55 90	„
May 1.		Colony Minnie Newman	150 00	11 51	Died.
„ 7.		Colony Pauline Colantha	397 46	400 00	Sold.
July 23.		Ena Netherland DeKol	400 00	10 00	Died; sold
Sept. 10.		Grebegga 2nd	700 00	.....	„ [hide.
Oct. 5.		Colony Beulah Segis	228 15	.....	„
Dec. 5.		Madam Bessie Posch	100 00	100 00	Traded.
„ 5.		Colony Pauline Segis	258 30	258 30	„
„ 5.		Colony Model Korndyke	377 28	377 28	„
1920.					
Jan. 1.	To	Colony Acme Pauline McKinley	438 55	.....	Died.
„ 1.		North Star Clothilde Beets	1,271 90	120 65	Beefed.
Feb. 14.		Colony Georgina McKinley	700 00	.....	Killed.
Mar. 31.		Marie Tensen	379 24	.....	Died.
		Travelling expenses *re* sale of Zarilda	349 25	.....	
		Increase on revaluation of herd by Farm Superintendent	.....	5,164 84	
			$7,748 73	$6,577 46	
			6,577 46		
		Loss	$1,171 27		

Abstract of Loss.

Deaths		$6,338 65
Increase in valuation	$5,164 84	
Profit on sale	2 54	
		5,167 38
Total		$1,171 27

YOUNG CATTLE DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Sales and Deaths.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Colony Paul DeKol Newman	$ 139 53	$ 150 00	Sold.
Colony King Rag	82 08	100 00	,,
Colony Botsford Valdessa	102 60	300 00	,,
Colony Model Valdessa	115 95	200 00	,,
Colony Segis McKinley	102 60	428 00	,,
Colony Posch Aaggie McKinley	15 93	22 70	Vealed.
Colony Calf No. 221	18 58	22 60	,,
Colony Poetess McKinley	270 81	.....	Died.
Colony Model McKinley	82 53	100 00	Sold.
Colony McKinley Valdessa	149 10	300 00	,,
Colony Lord Aaggie McKinley	127 80	1,000 00	,,
Colony Emma McKinley	10 65	.....	Died.
Calf No. 229A (vealed)	8 00	21 70	Vealed.
Colony Prince Newman	133 17	125 00	Sold.
Colony Posch Pauline Valdessa	155 70	1,000 00	,,
Colony Colantha Segis Valdessa	155 70	300 00	,,
Colony Zarilda Valdessa	57 10	1,000 00	,,
Colony Mutual Fayne Valdessa	145 30	200 00	,,
Colony Posch McKinley	93 42	150 00	,,
Colony Netherland McKinley	275 07	275 07	Traded.
Colony Canary Newman	67 20	300 00	Sold.
Colony Koba McKinley	310 08	310 08	Traded.
Colony Douglas Newman	62 40	500 00	Sold.
Colony Poet Newman McKinley	142 10	200 00	,,
Colony Morag McKinley	215 60	215 60	Traded.
Colony Jewel Champion	39 20	39 20	,,
Colony Mechthilda Newman	63 70	63 70	,,
Colony DeKol Segis Newman	117 60	150 00	Sold.
Calf No. 244 (vealed)	29 13	29 40	Vealed.
Colony Rooker Newman	108 90	100 00	Sold.
Colony Korndyke Valdessa	128 70	189 70	Traded.
Calf from Wimple Netherland Westport	7 50	13 49	Vealed.
Calf, Colony King Korndyke Newman	29 70	25 76	,,
Calf No. 192 (vealed)	207 90	64 80	,,
Calf, George Cornucopia	193 05	82 80	,,
Calf, Cornucopia Pride	198 00	82 80	,,
Half-interest, Colony Perfection Valdessa	109 65	300 00	Sold.
Colony Canary Fayne Newman	67 50	150 00	,,
Colony Sir Canary Valdessa	230 00	84 00	Beefed.
Deposit Account, Colony Cornucopia Champion	.....	25 00	
Advertisement, Holstein Friesian World	68 50	.....	
	$4,638 03	$8,621 40	
		4,638 03	
Profit		$3,983 37	

Abstract of Profit.

Sales	$4,264 83
Deaths	281 46
Total	$3,983 37

YOUNG HORSE DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
Colony Nerissa	$857 00 200 00	$200 00	Sold.
Loss	$657 00		

WORK-HORSE DEPARTMENT.

SALES AND DEATHS ACCOUNT, MARCH 31ST, 1920.

Name of Animal.	Asset Value.	Selling-price.	Remarks.
1919.			
Feb. 22. Bonson	$ 325 00	$ 35 00	Sold.
„ 18. Craigie Winsome	600 00	.....	Died.
May 27. Miss Craigmore	531 30	200 00	Sold.
1920.			
Mar. 31. Reduction made by Farm Superintendent on revaluation	1,461 93		
	$2,918 23 235 00	$235 00	
Loss	$2,683 23		

Abstract of Loss.

Sales	$ 621 30
Deaths	600 00
Reduction in valuation	1,461 93
Total	$2,683 23

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Expenses for 15 Months.

Salaries and upkeep	$ 5,785 94	
Feed for horses	12,141 28	
Board of employees	2,969 00	
Sundries	1,260 00	
		$ 22,156 22
Less teamsters' odd jobs	$ 319 05	
„ manure to fields	306 50	
„ shoeing for Boys' Industrial School	34 00	
		659 55
		$ 21,496 67

NOTE.—Against outlay of $21,496.67, 55,603 hours of team-labour were performed, making a cost of 38 cents per hour on basis of one horse-hour.

Returns.

To Horse-labour charged to crops and other departments at 40 cents per one horse-hour	$ 22,241 20

Expenses.

Total expenses as shown above	21,496 67
Profit	$ 744 53

WORK-HORSE DEPARTMENT—*Continued.*

HORSE-LABOUR PERFORMED, JANUARY 1ST, 1919, TO MARCH 31ST, 1920.

1919.	Production. Hours.	Cost.
January	3,238½	$ 1,152 90
February	3,031½	1,246 13
March	3,555½	1,347 12
April	4,192½	1,571 25
May	4,646	3,133 28
June	4,190	1,059 03
July	4,086½	881 40
August	4,339	1,314 00
September	3,661½	1,316 83
October	3,751½	1,509 54
November	2,924½	1,310 59
December	3,674½	1,354 23
1920.		
January	3,076½	1,155 38
February	4,019	1,195 05
March	3,216	1,082 24
K. McKay	....	1,123 20
	55,603	$21,752 17
Less manure, etc.		255 50
Cost		$21,496 67

Cost, 38⅝ cents per hour on basis of one horse-hour.

SHEEP DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

To Sales—		
971 lb. mutton to Essondale Institution	$ 291 30	
772 „ wool sold	367 02	
1 sheep sold, Burton & Ritter	100 00	
1 „ Experimental Farm, Lacombe	50 00	
1 „ J. Penman	75 00	
1 „ Major Young	50 00	
Sheep-pelts sold, Bissinger & Co.	59 95	
		$ 993 27
Inventory, March 31, 1920—		
37 ewes, pure-bred	$1,480 00	
2 rams, pure-bred	115 00	
2 wethers, pure-bred	50 00	
94 ewes, grade	1,692 00	
19 wethers, grade	342 00	
		3,679 00
		$ 4,672 27

Expenses.

Salaries and vouchers	$ 162 37	
Feed Account	2,561 98	
Board of employees	67 50	
Pasturage	202 25	
Horse-labour	9 25	
Carried forward	$3,003 35	$ 4,672 27

SHEEP DEPARTMENT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Expenses—Continued.

Brought forward		$3,003 35	$ 4,672 27
Inventory, Jan. 1, 1919—			
3 rams	$ 200 00		
24 ewes	960 00		
10 lambs	200 00		
74 grade ewes	1,332 00		
		2,692 00	
			5,695 35
Loss			$ 1,023 08

HOG DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

Pork supplied to Essondale Institution, 34,518 lb.		$9,481 23	
Pork supplied to City Institution, 23,659 lb.		6,446 87	
Sale of live hogs, 149 head		3,233 30	
			$ 19,161 40
Inventory, March 31, 1920—			
Essondale, 31 hogs, 4,770 lb.		$ 858 60	
New Westminster—			
29 sows		2,175 00	
9 pigs (fat)		648 00	
23 shoats		690 00	
5 boars		370 00	
51 hogs, 3 months old		612 00	
42 „ 1 month old		168 00	
12 „ 2 weeks old		25 00	
9 „ 1 week old		20 00	
			5,566 60
			$ 24,728 00

Expenses.

To 15 months' salary and vouchers	$2,033 09		
15 months' feed	7,899 60		
Horse-labour (hauling feed, etc.)	2,281 60		
Coal	4 50		
Boar purchased	87 50		
		$12,306 29	
Inventory, Jan. 1, 1919—			
23 sows at $50	$1,150 00		
6 „ $45	270 00		
30 hogs, average 200 lb.	1,020 00		
68 „ „ 125 lb.	1,445 00		
188 „ „ 85 lb.	2,820 00		
11 „ 6 weeks old	55 00		
15 „ 2 weeks old	60 00		
2 boars at $45	90 00		
1 boar at $30	30 00		
		6,940 00	
			19,246 29
Profit			$ 5,481 71

HOG DEPARTMENT—*Continued.*

ESSONDALE INSTITUTION—SUPPLY ACCOUNT, MARCH 31ST, 1920.

Pork.

1919.						
Jan.	To 1,708	lb. at	28	cents	$	478 24
Feb.	1,463	„	28	„		409 64
March.	1,807	„	28	„		505 96
April.	1,522	„	30	„		456 60
May.	1,782	„	29	„		516 78
June.	2,261	„	30	„		678 30
July.	2,352	„	32	„		752 64
Aug.	2,330	„	33	„		768 90
Sept.	2,798	„	27	„		755 46
Oct.	2,215	„	26	„		575 90
Nov.	2,181	„	27	„		588 87
Dec.	4,540	„	27	„		1,050 30
1920.						
Jan.	2,408	„	24	„		577 92
Feb.	2,328	„	25	„		598 29
March.	2,823	„	27	„		767 43
	Total				$	9,481 23

NEW WESTMINSTER INSTITUTION—SUPPLY ACCOUNT, MARCH 31ST, 1920.

Pork.

1919.						
Jan.	To 1,273	lb. at	28	cents	$	356 44
Feb.	1,400	„	28	„		392 00
March.	1,686	„	28	„		472 08
April.	1,848	„	30	„		554 40
May.	1,394	„	29	„		404 26
June.	1,711	„	30	„		513 30
July.	1,416	„	32	„		453 12
Aug.	1,250	„	33	„		412 50
Sept.	1,283	„	27	„		346 41
Oct.	1,426	„	26	„		370 76
Nov.	1,278	„	27	„		345 06
Dec.	3,012	„	27	„		637 74
1920.						
Jan.	1,340	„	24	„		321 60
Feb.	1,407	„	25	„		351 75
March.	1,935	„	27	„		515 45
	Total				$	6,446 87

POULTRY DEPARTMENT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

By 6,836 doz. eggs supplied Essondale Institution		$4,160 38	
3,059 lb. fowl „ „ „		1,200 78	
50 „ „ „ City Institution		22 50	
8 hens and 1 cockerel sold		20 25	
12 sittings eggs sold		17 00	
24 hens and 24 pullets sold		96 00	
6 sittings eggs sold		6 00	
Sittings eggs sold		17 50	
Cockerel sold		5 00	
Sittings eggs sold		10 50	
Inventory, March 31, 1920—			
214 White Leghorn hens at $2.25	$ 481 50		
282 „ pullets at $2.50	705 00		
96 Buff Orpington hens at $2.50	240 00		
36 „ pullets at $2.75	99 00		
35 Rhode Island Red pullets at $2.75	96 25		
11 cockerels (for stock) at $5	55 00		
3 „ at $1.55	4 75		
240 chicks at 60 cents	144 00		
125 „ 45 „	56 25		
45 doz. eggs (in incubators)	20 25		
20 „ „	9 00		
		1,911 00	
Stock of feed, March 31, 1920		90 22	
			$ 7,617 13

Expenses.

15 months' salary and vouchers	$ 850 30		
Feed Account	3,521 98		
Horse-labour	321 20		
Coal	72 09		
		$4,765 57	
Inventory, Jan. 1, 1919—			
228 Leghorn pullets	$ 399 00		
167 „ hens	250 50		
119 Orpington pullets	208 25		
127 „ hens	222 25		
135 cockerels	162 00		
7 „ (stock)	21 00		
Feed on hand	26 65		
		1,289 65	
			6,055 22
Profit			$ 1,561 91

TRUCK-GARDEN AND NURSERY.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

Produce supplied to Essondale Institution		$13,619 89	
„ „ Saanich Institution		136 35	
„ „ City Institution		1,796 94	
Seed for potato-crop		323 78	
Hog Department (feed)		142 57	
Sale of potatoes (2 sacks)		10 15	
Shrubs, etc., supplied City Institution		20 00	
„ „ Essondale Institution		2,716 90	
„ „ Saanich Institution		25 60	
Trees planted, Essondale roads		758 40	
Shrubs, etc., supplied public schools		1,478 60	
„ „ on Government account		302 55	
		$21,331 73	
Inventory, March 31, 1920—			
Nursery stock	$35,851 40		
Bees and bee-supplies	650 85		
Vegetables in storage	4,956 80		
		41,459 05	
			$ 62,790 78

Expenses.

15 months' salaries and vouchers		$ 4,413 09	
15 months' board		1,098 00	
Horse-labour		2,605 80	
Coal-supplies		81 60	
Uniforms		128 00	
Fertilizer, etc.		153 98	
		$ 8,480 47	
Potato-crop, farm to nursery, 352,570 lb.		5,288 55	
Root-crop, farm to nursery, 16,790 lb.		58 75	
Onion-crop, farm to nursery, 2,000 lb.		97 00	
		$13,924 77	
Inventory, Jan. 1, 1919—			
Nursery-stock	$29,349 45		
Vegetables in storage	4,653 00		
Bee-hives	252 00		
		34,254 45	
			48,179 22
Profit			$ 14,611 56

CROP DEPARTMENT.

POTATOES—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.

By Yield of crop.	598,183 lb., Field No. 1, at $30	$8,972 74	
„	83,085 lb., Field No. 7, at $30	1,246 65	
„	29,784 lb., Wilson Ranch, at $30	446 76	
Carried forward			$ 10,666 15

CROP DEPARTMENT—*Continued.*

POTATOES—PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward		$ 10,666 15
Expenses.		
To Fertilizer	$ 361 30	
Manure and hauling	467 40	
Ploughing and disking	731 70	
Seed and seeding	1,023 38	
Rolling and cultivating	201 20	
Digging and hauling	302 00	
Cleaning fields	29 60	
		3,116 58
Profit on crop		$ 7,549 57

Field No. 1, 25.25 acres; Fields Nos. 6 and 7, 4.16 acres; Wilson Ranch, 5.50 acres; total, 34.91 acres. Yield per acre, 10.18 tons; cost per ton, $8.76.

HAY—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield of hay, Field No. 3, 160,080 lb. at $25 per ton	$2,001 00	
„ silage, „ 3, 304,035 „ $5 „	759 75	
„ hay, „ 5, 80,000 „ $25 „	1,000 00	
„ „ „ 15, 3,600 „ $25 „	45 00	
„ „ „ 16, 12,600 „ $25 „	157 50	
„ „ „ 17, 10,800 „ $25 „	135 00	
Yield, Wilson Ranch .... 37,803 „ $25 „	472 50	
		$ 4,570 75
Expenses.		
To Seeds and seeding	$ 590 72	
Rolling	102 80	
Cutting and hauling	654 00	
		1,347 52
Profit		$ 3,223 23

Field No. 16, 2 acres; Field No. 5, 23.4 acres; Field No. 3, 39.25 acres; Wilson Ranch, 5.8 acres; total, 70.45 acres. Yield of hay per acre, 2.16 tons; cost per ton, $8.86.

ONIONS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield, 2,000 lb.		$ 97 00
Expenses.		
To Seeding	$ 15 60	
Manuring	5 60	
		21 20
Profit		$ 75 80

Field No. 4, 1 acre; yield per acre, 2,000 lb.

ROOTS (CARROTS, MANGELS, AND TURNIPS)—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield, carrots, 48,940 lb. at $7 per ton	$ 171 30	
„ turnips, 178,625 „ $7 „	632 20	
„ mangels, 235,485 „ $7 „	824 20	
Carried forward		$ 1,627 70

CROP DEPARTMENT—*Continued.*

ROOTS (CARROTS, MANGELS, AND TURNIPS)—PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward		$ 1627 70
Expenses.		
To Seed and seeding	$ 138 85	
Manuring	447 50	
Fertilizer	270 95	
Ploughing and cultivating	412 50	
Hauling	158 00	
		1,427 80
Profit		$ 199 90

Fields No. 6 and 7, carrots, 2.16 acres; Fields Nos. 6 and 7, turnips, 8 acres; Field No. 8, mangels, 12 acres; total, 22.16 acres. Yield per acre, 10.45 tons; cost per ton, $6.15.

WHEAT—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield, 6,230 lb. wheat		$ 264 75
Expenses.		
To Manuring	$ 12 00	
Ploughing	27 00	
Disk-harrowing	17 00	
Cutting	9 00	
Threshing	12 00	
		77 00
Profit		$ 187 75

Field No. 8, 4 acres; yield per acre, 0.778 ton; cost per ton, $24.60.

PEAS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield, 3,530 lb. seed-peas		$ 176 50
Expenses.		
To Manure	$ 34 00	
Seed	25 00	
Ploughing and disking	22 00	
Hauling	3 60	
		84 60
Profit		$ 91 90

Field No. 8, 2 acres; yield per acre, 1,765 lb.; cost per ton, $48.

OATS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield of oats, 148,109 lb. at $45 per ton	$3,331 49	
„ ensilage, 92,020 lb. at $5 per ton	230 35	
„ straw, 1,665 bales at 60 cents per bale	999 00	
„ green feed, 190,000 lb. at $5 per ton	475 00	
Carried forward		$ 5,035 84

CROP DEPARTMENT—*Continued.*

OATS—PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward		$ 5,035 84
Expenses.		
To Lime and fertilizer	$ 422 80	
Manuring	77 80	
Ploughing, disking, and rolling	1,515 75	
Seeding	302 30	
Cutting, threshing, and baling	577 60	
Binder-twine	28 50	
		3,124 75
Profit		$ 1,911 09

Field No. 3, 15.75 acres; Field No. 8, 19 acres; Wilson Ranch, 36.8 acres; Field No. 17, 15 acres; Field No. 18, 11.7 acres; total, 98.25 acres. Yield of threshed oats per acre, 1,507 lb.

ENSILAGE—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
Corn ensilage, fields Nos. 6 and 7, 620,620 lb.		$ 1,551 54
Peas, oats, and vetches, Field No. 8—		
Ensilage, 110,392 lb.	$ 276 00	
Oats threshed, 31,520 lb.	709 20	
Straw, 500 bales	300 00	
		1,285 20
		$ 2,836 74
Expenses.		
To Manuring	$1,002 90	
Ploughing, disking, and rolling	868 05	
Seed and seeding	462 30	
Cutting and hauling	255 20	
Cleaning fields	20 80	
		2,609 25
Profit		$ 227 49

Fields Nos. 6 and 7, 29.89 acres corn; Field No. 8, 23 acres peas, oats, and vetches; total, 52.89 acres.

BEANS—PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Production.		
By Yield, 1,075 lb. beans		$ 107 50
Expenses.		
To Ploughing	$ 40 60	
Seeding	28 80	
Cultivating	17 60	
		87 00
Profit		$ 20 50

Field No. 17, 3 acres.

PASTURAGE ACCOUNT, COLONY FARM.

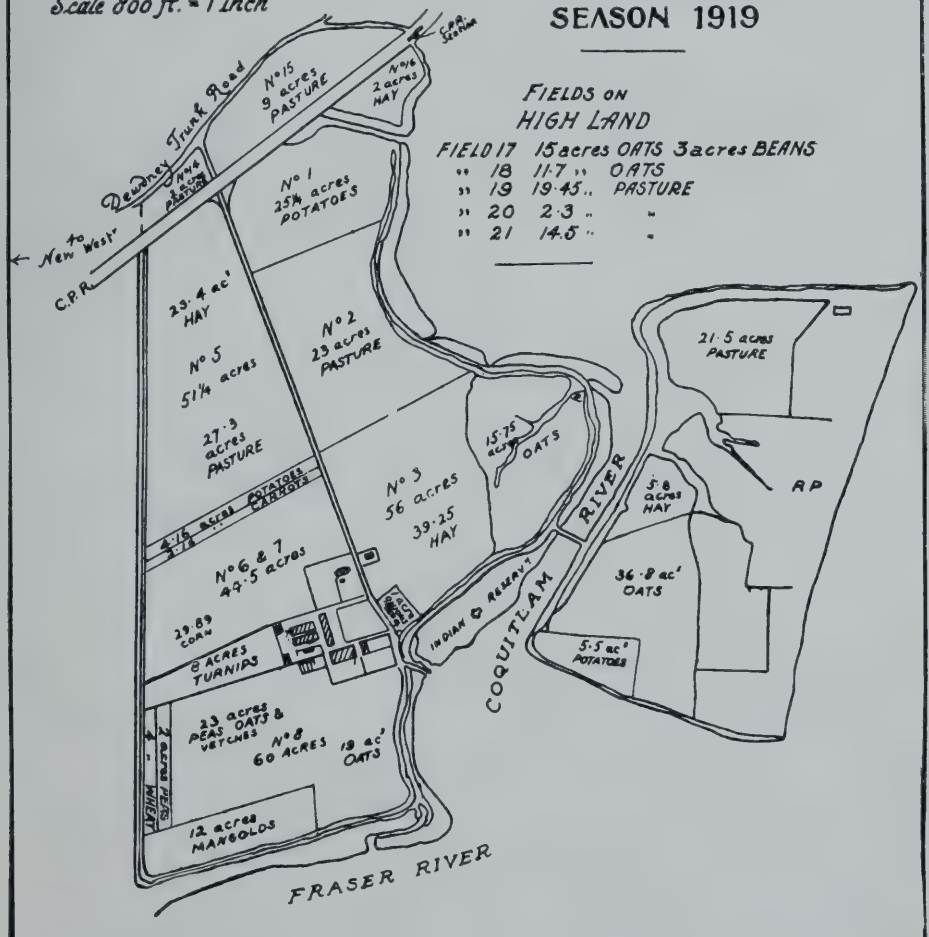
PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.		
By Sheep Department	$ 202 25	
Brood mares	118 00	
General dairy herd	406 00	
Young stock (cattle)	215 50	
Carried forward		$ 941 75

PLAN OF FIELDS

Provincial Government Colony Farm
District Lots 305, 170, 60 & 25 N.W.D
Municipality of Coquitlam.

Scale 800 ft. = 1 inch



CROPS RAISED
SEASON 1919

FIELDS ON HIGH LAND

FIELD 17	15 acres	OATS	3 acres BEANS
" 18	11·7 "	OATS	
" 19	19·45 "	PASTURE	
" 20	2·3 "	"	
" 21	14·5 "	"	

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PASTURAGE ACCOUNT—*Continued.*

PROFIT AND LOSS ACCOUNT—*Continued.*

Brought forward		$ 941 75
Expenses.		
To Rolling Field No. 2		10 40
Profit		$ 931 35

Field No. 2, 23 acres; Field No. 5, 27.30 acres; Wilson Ranch, 21.50 acres; total, 71.80 acres.

SHRINKAGE AND ROT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Loss.

To Potatoes, 46,328 lb.		$ 624 41
Oil-meal, 5,225 lb.		227 80
Loss		$ 852 21

TRACTOR ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

By 711 hours' work at $2.50 per hour		$ 1,777 50
Expenses.		
To 20 per cent. cost of tractor written off	$ 350 00	
Salary and vouchers	250 70	
Board of employees	150 00	
Oil and gasolene	769 23	
		1,519 93
Profit		$ 257 57

PRIZE-MONEY ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Receipts.

Canadian Holstein Friesian Association		$ 95 00
" " "	R.O.P.	32 50
" " "		5 00
" " "	R.O.M.	5 00
" " "		10 00
American Holstein Friesian Association		18 50
Canadian Holstein Friesian Association	R.O.M.	146 00
" " "	R.O.P.	30 00
" " "	R.O.M.	15 00
Total		$ 357 00

MAINTENANCE AND ADMINISTRATION ACCOUNT.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Loss.

To Salaries and vouchers for upkeep		$ 18,121 28
Dairy supplies to farm employees		577 66
Board furnished employees		2,597 70
Horse-labour for upkeep		1,144 80
Coal-supplies		894 99
Uniforms supplied employees		32 00
Sundries		783 47
Total loss		$ 24,151 90

EXHIBITION EXPENSES.

PROFIT AND LOSS ACCOUNT, MARCH 31ST, 1920.

Expenses.

To Freight		$ 152 78
Advertising		38 00
Sundries		20 19
Feed		99 45
Employees, transportation, etc.		217 70
Total		$ 528 12

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.

ESSONDALE INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1920.

Dairy produce—		
Milk, 315,516.9 lb.	$17,549 42	
Milk, employees, 56,769 lb.	3,188 10	
Butter, 3,806 lb.	2,381 47	
Cream, 378¾ lb.	113 63	
Buttermilk, 2,394 lb.	24 69	
		$ 23,257 31
Nursery produce—		
Vegetables, fruit, and honey	$15,543 40	
Roots, 4,550 lb.	16 85	
Beans	190 00	
		15,750 25
Meats—		
Beef, 545 lb.	$ 99 46	
Pork, 34,518 lb.	9,481 23	
Dressed poultry, 3,059 lb.	1,260 78	
Veal, 669½ lb.	135 65	
Mutton, 971 lb.	291 30	
		11,268 42
Incidentals—		
Horse-labour, 7,572½ hours	$ 3,029 00	
Eggs, 6,836 doz.	4,160 38	
Straw	23 79	
		7,213 17
Total		$ 57,489 15

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

NEW WESTMINSTER INSTITUTION—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1920.

Dairy produce—		
Milk, 207,022 lb.	$11,495 96	
Cream, 1,211 lb.	363 30	
Buttermilk, 1,051 lb.	11 26	
		$ 11,870 52
Nursery produce—		
Vegetables, fruit, and honey	$ 1,796 94	
Potatoes, 174,775 lb. at $30 per ton	2,616 07	
Roots, 10,995 lb. at $7 per ton	38 47	
		4,451 48
Meats—		
Dressed poultry, 50 lb.	$ 22 50	
Pork, 23.659 lb.	6,446 87	
		6,469 37
Incidentals—		
Shrubs	$ 20 00	
Sitting hens and eggs	161 25	
Chicken-feed	172 10	
Horse-labour, 6,258½ hours	2,503 40	
		2,856 75
Total		$ 25,648 12

MENTAL HOME, SAANICH—PRODUCE SUPPLIED BY COLONY FARM.

Supply Account, March 31st, 1920.

Nursery produce	$ 136 35
Live hogs	108 75
Shrubs, etc.	25 60
Total	$ 270 70

OUTSTANDING ACCOUNTS, MARCH 31ST, 1920.

Sundry accounts receivable	$ 699 95

SUNDRY COLLECTIONS REMITTED TO TREASURY.

Jan. 1st, 1919, to March 31st, 1920	$ 12,757 06

TREES, SHRUBS, ETC., SUPPLIED ESSONDALE INSTITUTION, JANUARY 1ST, 1919, TO MARCH 31ST, 1920.

1919.	
To Trees, etc., planted, new lawns, 1919	$ 2,327 80
„ „ roads, etc.	758 40
„ „ feeble-minded grounds	389 10
Total	$ 3,475 30

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

TREES, SHRUBS, AND PLANTS SUPPLIED TO PUBLIC SCHOOLS BY COLONY FARM AND NURSERY.

Supply Account, March 31st, 1920.

Jan. 1, 1919, to March 31, 1920—		
Coquitlam School	$	155 70
Normal School, Vancouver		121 25
Cloverdale School		204 35
Enderby School		105 70
Armstrong School		138 30
Richmond School		80 20
Johnston Road, Cloverdale		30 00
Burnaby School		77 50
White Rock School		68 40
Salmon Arm School		171 70
Duncan School		70 00
Kelowna School		233 20
Penticton School		22 30
Total	$	1,478 60

STOCK SUPPLIED ON GOVERNMENT ACCOUNT, JANUARY 1ST, 1919, TO MARCH 31ST, 1920.

Trees, etc., Boys' Industrial School	$	132 00
„ Government Agent, New Westminster		14 50
„ Supervisor, Agricultural Education		7 50
„ Industrial School for Girls		125 00
„ Game Farm, R.R. 3, Victoria		10 40
„ E. H. Bond, Revelstoke		13 15
Cow to Provincial Home		200 00
Total	$	502 55

BOYS' INDUSTRIAL SCHOOL.

Supply Account, March 31st, 1920.

Sundry labour, hauling lumber, rock, etc.	$	130 90
Horse-shoeing		34 00
Total	$	164 90

INVENTORY OF COWS ON HAND, MARCH 31ST, 1920.

Name of Animal.	Reg. No.	Amount.
Minnie Poetess	11824	$ 50 00
Koba DeKol	21672	400 00
Zarilda Clothilde 3rd, DeKol	14887	600 00
Ena Netherland DeKol 2nd	14666	100 00
Colony Model Emma	20607	100 00
Colony Pauline Canary	21207	250 00
Colony Alma Korndyke	26311	500 00
Colony Beulah DeKol Korndyke	26314	600 00
Colony DeKol Queenie Rag	26320	600 00
Colony Beets Korndyke	26322	450 00
Colony Bessie Canary	26308	600 00
Colony Lady Aaggie Newman	25926	800 00
Colony Fayne Canary	30128	600 00
Colony Beulah Pauline Korndyke	30131	650 00
Colony Jemima Wayne 2nd	30134	200 00
Carried forward	$	6,500 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF COWS ON HAND—*Continued.*

Name of Animal.	Reg. No.	Amount.
Brought forward		$ 6,500 00
Colony Sadie Canary	30137	800 00
Colony Maud Colantha	32360	400 00
Colony Jewel Newman	32063	150 00
Colony Georgie Korndyke	32361	200 00
Morag Vieman DeKol	31643	500 00
Durdre Douglas Segis	31842	550 00
Colony Princess Korndyke	36013	100 00
Portia Korndyke Segis	31843	125 00
Colony Madam Pauline Abbekerk	37413	50 00
Colony Poetess Korndyke 2nd	36012	550 00
Colony Contest Segis	36020	250 00
Colony Poetess Korndyke	36011	300 00
Colony Sena Newman	36010	800 00
Colony Aaggie Pietertje	38774	800 00
Colony Koba Segis	38770	500 00
Colony Cora Cornucopia	36008	700 00
Colony Rag Apple Cornucopia	38775	450 00
Colony Poetess Segis	38771	350 00
Colony Beets Newman	38776	600 00
Colony Alma Segis	36017	100 00
Colony Voruka Segis	36019	400 00
Colony Beets Segis	36014	150 00
Colony Netherland Segis Newman	36009	800 00
Colony Effie Cornucopia DeKol	37289	250 00
Colony Yvonne Cornucopia Segis	37287	250 00
Colony Ena Buttergirl	41644	350 00
Colony McKinley Canary	41646	125 00
Colony Korndyke Belle	38767	450 00
Colony Butter Lass	41645	400 00
Colony Aaggie McKinley	41647	125 00
Colony Queenie Rag Segis	41652	200 00
Colony Iantha Newman	41642	400 00
Colony Vrouka Pride	41643	125 00
Colony Netherland Segis Clothilde	42889	500 00
Colony Minnie Segis	41653	400 00
Colony Faforit McKinley	42884	1,000 00
Colony Minnie Segis DeKol	42882	450 00
Colony Lakeside McKinley	44629	450 00
Lulu Posch 3rd	216921	500 00
Colony Grebegga Segis	42891	400 00
Colony Lady McKinley	50291	250 00
Colony Segis Rag Apple	41650	350 00
Colony Alma Korndyke Segis	42890	75 00
Colony Marie McKinley	41648	200 00
Colony Korndyke Newman	50284	400 00
Colony Canary Buttergirl	42888	400 00
Colony Beets Cornucopia	44630	175 00
Colony Jewel Segis	50285	175 00
Wimple Westport Posch	61051	300 00
Wimple Netherland Westport	39966	400 00
Colony Bessie McKinley	52831	350 00
Carried forward		$ 19,075 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF COWS ON HAND—*Continued.*

Name of Animal.	Reg. No.	Amount.
Brought forward		$ 19,075 00
Colony Faforit Segis	52829	500 00
Colony McKinley Beulah	52828	400 00
Colony Segis Elsie Posch	44302	300 00
Madam Bessie Posch	25833	500 00
Colony Grebegga McKinley	60945	300 00
Colony Clothilde DeKol	38772	500 00
Colony Maud McKinley	50286	500 00
Colony Canary McKinley	50292	500 00
Colony Wayne McKinley	50289	500 00
Colony Beulah McKinley	52833	500 00
Asset value		$ 30,075 00

INVENTORY OF BULLS, MARCH 31ST, 1920.

Name of Animal.	Reg. No.	Amount.
Aaggie Cornucopia Newman	14981	$ 2,000 00
Colony McKinley Segis DeKol	20031	250 00
Colony Prince Posch Paul	16951	900 00
Asset value		$ 3,150 00

INVENTORY OF YOUNG CATTLE, MARCH 31ST, 1920.

Name of Animal.	Reg. No.	Amount.
Colony Nathalie McKinley	50288	$ 423 04
Colony Grebegga DeKol	54084	364 98
Colony Daisy McKinley	52834	337 32
Colony Durdre Douglas Segis	52836	320 74
Colony Segis McKinley	52835	315 20
Colony Koba Netherland	53527	312 44
Colony Melba Pride	56865	304 14
Colony Shadeland McKinley	56863	295 84
Colony Lass Valdessa	56866	287 56
Colony Ena McKinley	56864	282 02
Colony Rag Valdessa	56868	279 26
Colony Perfection Valdessa (half-interest)	34653	138 25
Colony Poetess Valdessa	56862	273 73
Colony Beets McKinley	60947	254 36
Colony Ena DeKol McKinley	60946	254 36
Colony Sylvia Newman	60943	248 85
Colony Maud Newman	60944	248 85
Colony Marie Jensen McKinley	63026	199 11
Colony Iantha McKinley	62389	193 55
Colony Belle Valdessa	63025	188 04
Colony Vale Korndyke Newman	63024	188 04
Colony Clothilde Newman (Calf No. 215)	.....	176 97
Colony Cora McKinley (Calf No. 216)	.....	176 97
Colony Lakeside Newman	67851	165 90
Colony Yvonne McKinley	67858	165 90
Colony Mercena Newman	67856	157 58
Colony Faforit Newman	67855	157 58
Carried forward		$ 6,710 58

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF YOUNG CATTLE—*Continued.*

Name of Animal.	Reg. No.	Amount.
Brought forward		$ 6,710 58
Colony Pauline Newman	67854	154 00
Colony Vrouka Newman	67853	149 31
Colony Newman Newman	67852	149 31
Colony Count Mercena McKinley	39969	143 76
Colony Lady Ormsby	71112	118 85
Colony Morag Ormsby	71115	118 85
Colony Fleta Newman	70850	113 35
Colony Brightest Newman	70849	113 35
Colony Curldyke Newman	70847	102 28
Colony Sena Ormsby	71114	96 76
Colony Marie Newman	71111	93 96
Colony Cyclone Ormsby	70844	93 96
Colony Girl Newman	71113	88 51
Colony Abbekerk Ormsby	70845	88 51
Colony Frontier Champion	41693	85 69
Colony Beulah P. Newman	70848	80 19
Colony Fayne Ormsby	70843	77 44
Colony North Star McKinley	41696	77 44
Colony Alma Newman	70846	66 37
Colony Cornucopia Champion	41691	63 55
Colony Sir Korndyke Newman	43557	60 80
Colony Lord Aaggie Champion	43555	58 05
Colony Jannek Ormsby	75673	44 23
Colony Schuilling Ormsby	75672	38 71
Colony Mercedes Newman	43553	33 16
Colony Zarilda Ormsby (Calf No. 260)	.....	30 39
Colony Poem Ormsby	75671	30 39
Colony Prince Pietje Champion	43554	27 64
Colony Countess Ormsby	75670	27 64
Colony Poetess McKinley	75674	24 89
Colony McKinley Mutual	43556	24 89
Colony Faforit Ormsby (Calf No. 267)	.....	13 82
Colony Effie Ormsby	.....	11 06
Colony George Perfection	.....	8 28
Colony Aldyke McKinley	.....	5 52
Colony Major Newman	.....	5 52
Colony Sadie Vale Champion	.....	2 76
Colony Koba Perfection	.....	2 76
Colony Posch Champion	.....	2 76
Colony Aaggie Pietertje Ormsby	.....	1 84
Colony P. S. McKinley (twin)	.....	1 84
Colony P. S. McKinley (twin)	.....	1 84
Colony Grebegga Valdessa	62388	188 38
Asset value		$ 9,433 19

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF BROOD MARES, MARCH 31ST, 1920.

Name of Animal.	Reg. No.	Amount.
Nerissa (Clydesdale)	28025	$ 5,000 00
Peggy Pride (Clydesdale)	28023	3,500 00
Colony Lady Begg (Clydesdale)	28940	2,000 00
Opal (Clydesdale)	28942	2,000 00
Colony Melita Dunure (Clydesdale)	33387	661 32
Colony Opal (Clydesdale)	34132	550 35
Colony Baroness (Clydesdale)	37585	256 83
Total		$ 13,968 50

INVENTORY OF WORK-HORSES, MARCH 31ST, 1920.

Name of Animal.	Reg. No.	Amount.
Levi	.....	$ 325 00
Harry	.....	400 00
Donald	.....	400 00
Sandy	.....	300 00
Jim	.....	450 00
Sharp (Pete)	.....	150 00
Jack (Joe)	.....	400 00
Dunrobin Doris	14400	600 00
McCallum Chestnut	.....	125 00
Jerry 2nd, No. 6	.....	465 93
Colony Pride (Scotty)	16601	566 72
No. 7, Prince	.....	500 00
Ragged	.....	30 00
Doll	.....	240 00
Doctor No. 3 (Buckskin)	.....	180 00
Jimmey 1st	.....	200 00
Colony Jean	.....	300 00
Billy McCallum	.....	350 00
Forage Heroine	.....	600 00
Repertoire	.....	100 00
Bramhope Emerald	.....	600 00
Belle	.....	175 00
Jock	.....	400 00
Barney	.....	400 00
Total		$ 8,257 65

INVENTORY OF YOUNG HORSES, MARCH 31ST, 1920.

Name of Animal.	Reg. No.	Amount.
Colony Lady Begg (colt)	45437	$ 1,227 60
Colony Opal (colt)	35	843 92
Opal (colt)	36	843 92
Colony Lady Dunure	45438	441 15
Colony Lady Pride	45440	393 19
Colony Lady Black	45439	364 42
Total		$ 4,114 20

INVENTORY OF SHEEP, MARCH 31ST, 1920.

37 ewes, Oxford Down pure-bred, at $40	$ 1,480 00
2 rams, " "	115 00
2 wethers " "	50 00
94 grade ewes at $18	1,692 00
19 grade wethers	342 00
Total	$ 3,679 00

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF HOGS ON HAND, MARCH 31ST, 1920.

Essondale, 31 hogs, 4,770 lb.	$	858 60
New Westminster—		
29 sows at $75		2,175 00
9 pigs (fat), 3,600 lb.		648 00
23 shoats		690 00
5 boars		370 00
51 hogs, 3 months old		612 00
42 „ 1 month old		168 00
12 „ 2 weeks old		25 00
9 „ 1 week old		20 00
Total	$	5,566 60

INVENTORY OF POULTRY DEPARTMENT, MARCH 31ST, 1920.

214 White Leghorn hens at $2.25 each	$	481 50
282 „ pullets at $2.50 each		705 00
96 Buff Orpington hens at $2.50 each		240 00
36 „ pullets at $2.75 each		99 00
35 Rhode Island Red pullets at $2.75 each		96 25
11 cockerels (for stock) at $5 each		55 00
3 „ at $1.55 and $1.65		4 75
240 chicks at 60 cents each		144 00
125 „ at 45 cents each		56 25
45 doz. eggs for incubators at 45 cents per doz.		20 25
20 „ „ at 45 cents per doz.		9 00
Total	$	1,911 00

Feed on Hand.

300 lb. bran	$	7 02
100 „ chick-feed		5 75
300 „ wheat		15 00
600 „ oats		14 10
700 „ ground oats		16 45
400 „ grit		10 00
700 „ shelling		15 75
1 can coal-oil		1 65
10 sacks coal		4 50
Total	$	90 22

INVENTORY OF FEED AND PRODUCE, MARCH 31ST, 1920.

Articles.	Quantity.		Amount.
Beans	1,075	lb.	$ 107 50
Peas	3,530	„	176 50
Oats	6,000	„	159 45
Straw	161	bales	133 00
Hay	59,069	lb.	784 93
Potatoes	94,417	„	1,323 47
Roots	160,506	„	561 77
Gluten	1,700	„	64 76
Feed-flour	5,900	„	197 65
Carried forward			$ 3,509 03

MISCELLANEOUS STATEMENTS, INVENTORIES, ETC.—*Continued.*

INVENTORY OF FEED AND PRODUCE, MARCH 31ST, 1920—*Continued.*

Articles.	Quantity.	Amount.
Brought forward		$ 3,509 03
Rice-meal	215 lb.	4 74
Cotton	1,800 „	72 00
Alfalfa	2,160 „	51 07
Oil-meal	210 „	9 45
Bran	4,900 „	114 86
Total		$ 3,761 15

NURSERY AND GARDEN INVENTORIES, MARCH 31ST, 1920.

Truck-garden and nursery	$ 10,921 50
Shrubs and small trees	5,810 15
Evergreen trees and shrubs	5,273 75
Climbing plants	317 50
Roses	89 50
Reeds and grasses	372 00
Herbaceous perennials	1,611 10
Bulbs and tubers	130 00
Flowering, cherries, etc.	124 40
Conifers and evergreens	991 40
Shade-trees	123 90
Shrub layers and cuttings	187 55
Tree and shrub seedlings	386 10
Fruit-trees in orchard	3,307 00
Bush and small fruits	5,323 80
Tools, etc.	881 75
	$ 35,851 40
Bees and bee-supplies	650 85
Vegetables in storage	4,956 80
Total	$ 41,459 05

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